REMEDIAL INVESTIGATION/FEASIBILITY STUDY
CONRAIL SITE
ELKHART, INDIANA

REMEDIAL INVESTIGATION REPORT
VOLUME 2 OF 2

ARCS CONTRACT NO. 68-W8-0086
WORK ASSIGNMENT NO. 01-5L7Y

March 31, 1994

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region V
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PHASE II REMEDIAL INVESTIGATION
CONRAIL RI/FS
ELKHART, INDIANA

TECHNICAL MEMORANDUM

WORK ASSIGNMENT NUMBER 01 - 5L7Y

July 22, 1992

Prepared for:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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Contract 68-W8-0086
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1. INTRODUCTION

This technical memorandum summarizes the procedures and results of lead-screen auger (LSA) sampling, soil sampling, groundwater monitoring and sampling, and aquifer characteristics testing conducted by Ecology and Environment, Inc. (E & E), as part of the Phase II Remedial Investigation (RI) at the Conrail site in Elkhart, Indiana. The objectives of the Phase II investigation were to preliminarily identify and define the potential source(s) of groundwater contamination in the study area; further define the nature and extent of the groundwater contaminant plumes; further define hydrologic characteristics of the aquifer(s) of concern that may influence contaminant migration patterns; and collect data necessary to support the evaluation of remedial alternatives for the Feasibility Study (FS). The technical memorandum integrates existing data, including the Phase I results presented in technical memoranda and the report titled "Preliminary Evaluation of Phase I RI Results and Interim Remedial Alternatives for the Conrail/County Road 1 RI/FS" (E & E April 1990; revised June 1990), with new information gathered during the Phase II field investigation activities.

To meet the Phase II objectives, the sampling and monitoring well installation program was implemented in accordance with the United States Environmental Protection Agency (EPA)-approved Work Plan (WP), Field Sampling Plan (FSP), and Quality Assurance Project Plan (QAPP) developed by E & E for the site (E & E 1991a, b, c). Modifications to these plans necessitated by field conditions actually encountered were discussed with and approved by EPA prior to implementation. Section 2 describes the procedures E & E used during the Phase II field investigation for LSA groundwater sampling and analysis, surface and subsurface soil sampling, monitoring well installation and water level measurement.

groundwater sampling, and aquifer characteristics testing. Section 3 presents a summary of the physical results and with a brief discussion of these results. Section 4 presents and discusses the analytical results. Section 5 presents conclusions and data gaps, and Section 6 presents references.

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2. PHASE II FIELD INVESTIGATION PROCEDURES

2.1 LEAD-SCREEN AUGER SAMPLING

From July 17 to November 6, 1991, E & E subcontracted Bergerson-Caswell, Inc. (BC), of Maple Plain, Minnesota, to perform drilling and related activities for the Conrail Phase II field investigation. The first part of this work, through September 25, 1991, consisted of LSA drilling and groundwater sampling. Use of this technique allowed sampling of the groundwater within the plume(s) at discrete depth intervals to determine the vertical extent of contamination, and provided information on the optimum depths for monitoring well screened intervals. The technique also was used to provide information bearing on the location and extent of potential source areas. A total of 30 LSA borings was completed by BC under the direction of E & E. The locations of the LSA borings are presented in Figure 2-1. Samples analyzed at the field laboratory included 310 groundwater samples from discrete lead-screen intervals, together with 135 duplicate samples, field blanks, and trip blanks. Samples were analyzed using the purge and trap method with a gas chromatograph (GC) for carbon tetrachloride (CCl_4), trichloroethene (TCE), and 1,1,1-trichloroethane (TCA). Chloroform was added to the compounds analyzed for after the start of the LSA investigation. Results of these analyses are discussed in Section 4 and presented in Appendix A.

The procedures used for the LSA technique are in accordance with the FSP. At each LSA boring location, BC used a CME75 drill rig to advance 4-¼-inch hollow-stem augers, coupled with a slotted lead auger, by conventional drilling methods. A stainless steel plug was inserted into the end of the lead auger to prevent heaving sands from entering the auger. The augers were advanced at 5-, 10-, or 20-foot depth intervals. At

these discrete depths, the 5-foot LSA was sealed from the flights above it with a downhole packer system. The packer system was constructed of a sliding head inflatable packer that expended radially as pneumatic pressure was applied. The expandable packer gland was mounted on a 2-inch inside diameter (ID) mandrel pipe. This packer assembly was attached to the end of a 2-inch ID stainless steel riser pipe and positioned downhole just above the LSA. When in position, the packer was inflated with nitrogen, creating an effective seal over the entire length of the packer gland element. This seal isolated the LSA and thus minimized the volume of purge water generated. With the packer inflated, the level of standing water in the riser was measured with a graduated stainless steel chalked tape so that the volume of water in the LSA section plus the 2-inch riser could be calculated. A minimum of three standing volumes of water was purged from the LSA and riser with a 1.75-inch outside diameter (OD) Keck™ helical rotor-type submersible pump positioned inside the LSA. Between each volume, the purge water was tested for pH, conductivity, and temperature. Purging was considered complete when all three parameters had stabilized for three consecutive readings (± 0.25 pH units, ± 50 μmhos/cm, and ± 0.5 °F). If the LSA plus riser pumped dry, 15 minutes of recharge was allowed and then pumping was resumed. If the LSA plus riser pumped dry three times, the interval was considered to be purged and the sample was collected as soon as sufficient recharge had occurred. Following purging, the groundwater sample was collected directly from the submersible pump's discharge hose into two 40-mL glass volatile organic analysis (VOA) vials with zero headspace. Each vial was labeled with boring number, depth of sample, and date/time of collection. Samples were cooled immediately on ice and transported to the field laboratory for CCl_4, TCE, and TCA analyses. A daily trip blank was prepared by the chemist from deionized water, transported on-site, and analyzed at the end of each day.

After each sample was collected, the pump, packer, and riser were removed from the augers and decontaminated with a steam cleaner. In addition, a solution of Liquinox™ and potable water, followed by a potable water rinse, was run through the pump between samples to decontaminate the internal elements of the pump and discharge hose. At least one rinsate blank sample of potable water run through the pump was collected daily and analyzed at the field laboratory to monitor internal decontamination of the pump. In addition, samples collected directly from the potable water source were analyzed occasion-

ally throughout the lead-screen program to ensure that this water remained free from contamination. The source of potable water was the Henry R. Ferrettie/Baugo Creek County Park, location of the E & E field office.

Following completion of each LSA boring, the stainless steel plug was removed from the auger and the borehole abandoned by tremie-sealing with Enviroplug™ bentonite grout as the augers were withdrawn. Drill cuttings were sealed in 55-gallon drums and bulked later in roll-off boxes. All purge and pump decontamination water was also collected for disposal (see Section 2.5, Investigation-Derived Waste).

At each LSA boring location, drilling and sampling continued downward through the aquifer to the top of bedrock, until a minimum of two consecutive samples (minimum 20 feet) showed non-detects for CCl_4, TCE , and TCA or until the maximum achievable depth of 148 feet below ground surface (BGS) was reached.

To evaluate its effectiveness, the LSA investigation was initiated immediately adjacent to existing monitoring wells MW02S and MW02D, where Phase I groundwater results revealed elevated concentrations of both TCE and CCl_4. At this location, groundwater samples were collected from the LSA at depths similar to the screened interval of the monitoring wells. A comparison of GC results on the two sets of samples was similar, so the decision was made to proceed with the LSA program as outlined in the WP. The ultimate number and final locations of LSA borings were based mainly on field GC results and were decided upon by the Field Team Leader (FTL), the Site Manager (SM), and the Remedial Project Manager (RPM).

To minimize equipment cross-contamination of samples, borings were first drilled in locations of non-detected or low groundwater contamination, namely upgradient and far downgradient of suspected source areas based on Phase I analytical results. Based on the known groundwater flow direction also determined from Phase I data, successive borings were completed in areas of progressively higher levels of groundwater contamination. In a few cases, this pattern was disrupted when higher than expected concentrations were encountered, but in general the pattern was followed to the extent possible.

2.2 SOIL SAMPLING

Soil sample collection procedures are in accordance with the FSP. Following preliminary identification of source locations with the LSA sampling technique, soil borings

were drilled and soil samples collected in these areas (Plate 1) to define the nature and preliminary extent of source contamination. From September 16 to October 8, 1991, 20 soil borings ranging from 6 feet to 44.5 feet BGS were completed. Drilling was conducted by BC with the CME75 rig and 4-¼-inch hollow-stem augers. Soil samples were collected every 2.5 feet with a 3-inch OD, 24-inch long split-spoon. Each split-spoon soil sample was visually classified by an E & E geologist, who maintained a detailed log of sample depth, blow count, recovery, soil description, and, if any, organic vapor analyzer (OVA) readings. Soil boring logs are presented in Appendix B. Between samples, the split-spoons were decontaminated with Liquinox™ solution, isopropanol, and distilled water. In most cases, each borehole was advanced to just below the water table, or until no further OVA readings were obtained from the soil samples. In a few cases, soil borings were advanced to greater depths to determine whether a clay layer was present. Between borings, the augers were decontaminated with a steam cleaner. After each boring, the hole was tremie-grouted to the surface with Enviroplug™ bentonite grout as the augers were withdrawn. Drill cuttings were sealed in 55-gallon drums and bulked later in roll-off boxes for future disposal.

The OVA screening results, visual observations, and LSA results were the primary criteria for selection of three depth-specific samples from soil borings for submission to Contract Laboratory Program (CLP) laboratories for analysis. Table 2-1 summarizes soil boring samples selected for specific CLP analyses. The quantitation limits for the CLP Target Compound List and Target Analyte List are presented in Tables 2-2 and 2-3, respectively. Soil samples were not submitted for analysis from each soil boring drilled. Results of these analyses are discussed in Section 4 and presented in Appendix C.

2.3 MONITORING WELL INSTALLATION

Monitoring well installation was performed in accordance with the FSP. From October 5 to November 5, 1991, 32 new monitoring wells were installed in the study area based on the preliminary location of source areas identified through LSA sampling. Typically, the new monitoring wells were installed immediately upgradient, downgradient, and within preliminarily identified source areas to verify these source locations and to provide groundwater quality data necessary for the Risk Assessment (RA) and FS. Other new wells, including some screened at different levels at existing Phase I well nests, were

positioned to further delineate the vertical extent of contamination and to refine understanding of the groundwater flow regime in deeper portions of the aquifer. Locations of Phase II monitoring wells are presented in Figure 2-2.

Monitoring well borings were advanced to shallow, intermediate, deep, and top of bedrock depths by conventional hollow-stem auger or mud rotary drilling techniques. Soil samples for subsurface stratigraphic description were collected from monitoring well borings using a 24-inch-long, 2-inch or 3-inch OD split-spoon sampler at 5-foot depth intervals, generally beginning at or near the ground surface. The geologist maintained a detailed log of sample depth, blow count, recovery, soil description, and, where appropriate, OVA readings. Monitoring well boring logs are presented in Appendix D. Samples from screened intervals and low permeability strata were saved in sealed glass jars and stored for possible future use, as needed. After being described by the geologist, the rest of the split-spoon samples were containerized with the cuttings for later disposal.

All monitoring wells were constructed with 2-inch ID stainless steel flush-jointed riser pipe and screens. Screens were 10 feet long with 0.01-inch slots of continuous wire-wound design. A filter pack of 100% silica sand was created in the annular space surrounding each screen to approximately 2 feet above the screen. In wells where the top of the screen was located above the water table, a minimum 2-foot bentonite pellet seal was placed above the filter pack and hydrated with potable water. In wells screened below the water table, this sealing procedure was not possible because of clumping and bridging of the pellets. In these wells, a 2-foot seal of the thickest bentonite slurry that could be tremied was placed above the filter pack. Both types of seals were allowed to stand until an adequate seal formed. Then bentonite grout was tremied from the seal up to within 2 to 3 feet of the surface. In the case of the hollow-stem auger technique, this was done as the augers were withdrawn. In the case of the mud rotary drill hole, the grout was tremied from the seal upward, displacing the drilling mud to the surface where it was drummed for disposal. A 5-foot protective steel cover with a locking cap was placed over each well and cemented in place to provide security.

Table 2-4 presents the specifications of the 32 Phase II monitoring wells. Thirteen shallow monitoring wells were installed and screened at depths to intersect the water table or the area immediately below it. Shallow wells ranged in depth from 17 feet to 31 feet BGS. Eleven intermediate monitoring wells were installed and screened at depths ranging

from 47 feet to 76 feet BGS. Intermediate well depths were determined based on LSA results. Four deep monitoring wells were installed at depths ranging from 101 feet to 125 feet BGS, also controlled by LSA results. Additionally, four top of bedrock monitoring wells were installed at depths ranging from 145 feet to 169 feet BGS. Monitoring well MW08BR is screened immediately above a thick clay/silt layer believed to overlie bedrock. No confining layer was encountered during drilling and thus none of the Phase II wells are double cased.

Between samples, the split-spoons were cleaned with potable water using a brush. Drill rigs, augers, rods, and ancillary equipment were decontaminated with a steam cleaner between borings, as were all screens and risers before installation. Drill cuttings and drilling mud were sealed in 55-gallon drums for later disposal.

Completed wells were allowed to stand for a least 24 hours to allow the grout and concrete pad to set up before the wells were developed. The first step of development at each well was to measure the standing water level so that the purge volume could be determined. An airlift system was used to purge the water for development. Each volume of water was tested for pH, conductivity, and temperature, and examined for relative turbidity/clarity. Purging continued until pH, conductivity, temperature, and relative clarity had stabilized, and the well was producing at the maximum achievable rate. In many cases, this required purging from five and 10 well volumes. Water-measurement and airlift equipment was decontaminated with a high-pressure steam cleaner between uses. All purge and decontamination water was containerized for later disposal.

2.4 MONITORING WELL SURVEYING AND GROUNDWATER SAMPLING

All monitoring well surveying and groundwater sampling procedures are in accordance with the FSP. From December 2 to December 6, 1991, the elevations of the top of the inside casing (TOIC) of the Phase II monitoring wells were surveyed in feet above mean sea level (MSL), and 31 Phase I and 32 Phase II wells were sampled. Access to Phase I wells MW05S, MW05D, MW06, and MW09 was refused by the property owner, so these wells were not included in this round of sampling.

At each Phase II monitoring well, the TOIC point from which water level measurements were to be taken was surveyed by E & E with respect to a U.S. Geological Survey benchmark to a vertical accuracy of ± 0.01 foot (see Table 2-5). The TOIC elevations

were used to convert standing water depth measurements into elevations above MSL (Table 2-5). The horizontal location of each well has also been determined to an accuracy of approximately ± 10 feet through aerial photographs and a scale map of the study area.

Groundwater sampling was performed concurrently with well elevation surveying activities. Before sampling, water levels were measured in all wells with a chalked graduated stainless steel tape; measurements were made both for hydrologic studies and purge volume calculations prior to sampling. Water levels were measured as depth below TOIC. Static water volumes were calculated using the following formula:

$$V = Tr^2 (0.163)$$

where:

V	=	Static volume of well in gallons;
T	=	Depth of water in well, measured in feet;
r	=	Inside radius of well casing in inches; and
0.163	=	A constant conversion factor.

A maximum of three static water volumes was purged from each well prior to sample collection to ensure that a representative groundwater sample was collected. Bottom-loading stainless steel bailers were used to purge all shallow and some intermediate wells. A Keck™ submersible pump was used to purge the remaining intermediate wells and all deep and bedrock wells. At the end of each purge volume, the water was tested for pH, conductivity, and temperature, and relative turbidity/clarity was noted. After three volumes were purged and after stabilization of these parameters, the sample was collected. In the few cases where the wells did not recharge quickly enough to purge three volumes, the wells were purged dry, and then the sample was collected as soon as there was sufficient recharge for an adequate sample volume.

All groundwater samples, with the exception of the sample collected from monitoring well MW18S, were collected with bottom-loading stainless steel bailers. Sample MW18S was collected from a pitcher pump because aboveground damage to the well did not allow a bailer or pump to be placed into the well to collect a sample. During sample collection, care was taken to not agitate the sample water and thus lose volatile components. VOA sample portions were always collected first if other CLP parameters were being analyzed for.

Bailers were decontaminated before and between use with a high-pressure steam cleaner, sprayed with isopropanol/alcohol, rinsed with deionized water, and wrapped in aluminum foil until the next use. The outside of the Keck™ pump and discharge hose were cleaned with the steam cleaner, and the inside decontaminated with Liquinox™ and deionized water.

Groundwater samples were collected for analysis from each monitoring well. Table 2-6 is a summary of the analysis program for groundwater samples. The quantitation limits for the CLP Target Compound List and Target Analyte List are presented in Tables 2-2 and 2-3, respectively. Results of these analyses are discussed in Section 4 and presented in Appendix E. Samples collected for VOA analysis were preserved with hydrochloric acid and ice. Samples collected for dissolved metals analysis were filtered with a Masterflex™ pump coupled with an in-line, 0.45-μm filter and then preserved with nitric acid. Sulfuric acid was used to preserve samples scheduled for chemical oxygen demand (COD), total organic carbon (TOC), oil and grease, and nitrate/nitrite analyses, and ice was used to preserve samples for biochemical oxygen demand (BOD), total dissolved solids (TDS), total suspended solids (TSS), and alkalinity analyses. All samples were labeled, packaged, iced, and shipped in accordance with appropriate procedures stated in the project plans.

Duplicate groundwater samples were collected simultaneously with investigative samples in equal volumes, with the same sampling equipment, and into identical containers. Duplicates were preserved and handled in the same manner as all other groundwater samples. Field blanks were prepared from contaminant-free deionized water that was routed through decontaminated sampling equipment, including filtration apparatus when appropriate. Field blanks were containerized and handled in the same manner as all other groundwater samples. Duplicate and field blank samples were collected at the rate of one per every 10 or fewer groundwater samples. Trip blanks were prepared by E & E, transported on-site by the sampling team, and shipped with the remainder of the samples to the appropriate laboratory at the rate of one per shipping container containing VOA samples per day.

2.5 SLUG TESTS

Slug tests were conducted on 12 Phase II groundwater monitoring wells. The tests were conducted to obtain in situ measurements of the hydraulic conductivity of the aquifer materials present adjacent to the screened interval of the wells. All tests conducted were rising head tests, meaning that after the water was displaced, the data were collected as the water level rose to equilibrium.

The slug used to displace water was a 1-inch OD, 3-foot-long PVC pipe filled with silica sand, which was attached to a stainless steel cable. An Oil Recovery System™ (ORS) data logger, equipped with a 15-psi pressure transducer and interfaced with a printer, was used to record time-dependent head pressure at the test locations. Upon removal of the slug from the well, data were collected until the water level returned to its static condition. Typically, data collection lasted between 10 seconds and 10 minutes.

2.6 INVESTIGATION-DERIVED WASTE

All drill cuttings from LSA, soil, and monitoring well borings were stored in 55-gallon drums until they could be removed from the drilling locations, usually within one to two days. The drums were then loaded onto a truck by a BC employee using a Bobcat™ and taken to E & E field office at Baugo Creek Park, where they were emptied into roll-off boxes, pending future bulk disposal. The drums were then reused in the same manner. Currently, all roll-off boxes have been properly disposed of at a State of Indiana-licensed landfill.

Used drilling mud from the mud rotary drill holes was put in 55-gallon drums and stored separately from the cuttings. This mud was later dewatered to the extent possible with a pump by E & E and consolidated into the fewest number of drums possible. All drilling mud has been properly disposed of at a State of Indiana-licensed landfill.

All purge water from LSA groundwater sampling, monitoring well development, monitoring well sampling, and all decontamination water was collected into a 500-gallon tank at each location and trucked to the E & E field office. The 500-gallon tank then was pumped into a 5,000-gallon tanker, tested, and properly disposed of at the Elkhart Wastewater Treatment Plant.

Table 2-1

PHASE II SOIL BORING SAMPLES

Boring	Depth (feet)	VOA	ABN	Pest./PCB	Total Metals	TOC
B20	5 - 6.5	a	a	--	--	--
	7.5 - 9.5	a	a	--	--	--
	10 - 12	a	a	--	--	--
B21	2.5 - 4.5	a	a	--	--	--
	5 - 7	a	a	--	--	--
	10 - 12	a	a	--	--	--
B22	2.5 - 4.5	Da	Da	--	--	--
	5 - 7	a	a	--	--	--
	7.5 - 7.9	--	--	Da	Db	Dc
	10 - 12	a	a	--	--	--
B23	2.5 - 4.5	a	a	--	--	--
	5 - 7	a	a	--	--	--
	10 - 12	a	a	--	--	--
B24	5 - 7	d	d	--	--	--
	20 - 22	d	d	--	--	--
	22.5 - 24.5	d	d	--	--	--
B25	5 - 7	d	d	--	--	--
	20 - 22	d	d	--	--	--
	23.5 - 25.5	d	d	--	--	--
B26	2.5 - 4.5	d	d	--	--	--
	22.5 - 24.5	d	d	d	b	c
	27 - 29	d	d	--	--	--
B27	10 - 12	d	d	--	--	--
B28	0 - 2	Dd	Dd	--	--	--
	2.5 - 4.5	d	d	--	--	--
	15 - 17	d	d	d	b	c

Table 2-1

PHASE II SOIL BORING SAMPLES

Boring	Depth (feet)	VOA	ABN	Pest./PCB	Total Metals	TOC
B29	0 - 2	d	d	--	--	--
B32	0 - 2	d	d	--	--	--
B35	0 - 2	d	d	--	--	--
	7.5 - 9.5	d	d	--	--	--
	12.5 - 14.5	d	d	--	--	--
B36	2.5 - 4.5	d	d	--	--	--
	5 - 7	d	d	--	--	--
	12.5 - 14.5	d	d	d	b	c
B37	5 - 7	d	d	--	--	--
	15 - 17	d	d	--	--	--
	17.5 - 19.5	d	d	--	--	--
B38	2.5 - 4.5	d	d	--	--	--
	10 - 12	d	d	--	--	--
	15 - 17	d	d	--	--	--
B39	5 - 7	Dd	Dd	--	--	--
	15 - 17	d	d	--	--	--
	20 - 22	d	d	--	--	--
Totals						
Analyses		42	42	4	4	4
Duplicate Analyses		4	4	1	1	1

Key:

- a Analysis performed by University of Iowa, University Hygenic Lab.
- b Analysis performed by Northern Laboratories.
- c Analysis performed by American Analytical and Technical Services.
- d Analysis performed by Clayton Environmental Consultants.
- D Duplicate sample also submitted for analysis.
- -- Sample was not submitted for analysis.

Table 2-2

CONTRACT LABORATORY PROGRAM
TARGET COMPOUND LIST
VOLATILE QUANTITATION LIMITS

Compound	CAS #	Water	Soil Sediment
Chloromethane	74-87-3	10 ug/L	10 ug/kg
Bromomethane	74-83-9	10	10
Vinyl chloride	75-01-4	10	10
Chloroethane	75-00-3	10	10
Methylene chloride	75-09-2	10	10
Acetone	67-64-1	10	10
Carbon disulfide	75-15-0	10	10
1,1-dichloroethene	75-35-4	10	10
1,1-dichloroethane	75-34-3	10	10
1,2-dichloroethene (total)	540-59-0	10	10
Chloroform	67-66-3	10	10
1,2-dichloroethane	107-06-2	10	10
2-butanone (MEK)	78-93-3	10	10
1,1,1-trichloroethane	71-55-6	10	10
Carbon tetrachloride	56-23-5	10	10
Vinyl acetate	108-05-4	10	10
Bromodichloromethane	75-27-4	10	10
1,2-dichloropropane	78-87-5	10	10
cis-1,3-dichloropropene	10061-01-5	10	10
Trichloroethene	79-01-6	10	10
Dibromochloromethane	124-48-1	10	10
1,1,2-trichloroethane	79-00-5	10	10
Benzene	71-43-2	10	10
Trans-1,3-dichloropropene	10061-02-6	10	10
Bromoform	75-25-2	10	10
4-Methyl-2-pentanone	108-10-1	10	10
2-Hexanone	591-78-6	10	10
Tetrachloroethene	127-18-4	10	10
Toluene	108-88-3	10	10
1,1,2,2-tetrachloroethane	79-34-5	10	10

Table 2-2 (Cont.)

CONTRACT LABORATORY PROGRAM
TARGET COMPOUND LIST
VOLATILE QUANTITATION LIMITS

Compound	CAS #	Water	Soil Sediment
Chlorobenzene	108-90-7	10 ug/L	10 ug/kg
Ethyl benzene	100-41-4	10	10
Styrene	100-42-5	10	10
Xylenes (total)	1330-20-7	10	10

Table 2-2 (Cont.)

CONTRACT LABORATORY PROGRAM
TARGET COMPOUND LIST
SEMIVOLATILE QUANTITATION LIMITS

Compound	CAS #	Water	Soil Sediment
Phenol	108-95-2	10 ug/L	330 ug/kg
bis(2-Chloroethyl) ether	111-44-4	10	330
2-Chlorophenol	95-57-8	10	330
1,3-Dichlorobenzene	541-73-1	10	330
1,4-Dichlorobenzene	106-46-7	10	330
Benzyl Alcohol	100-51-6	10	330
1,2-Dichlorobenzene	95-50-1	10	330
2-Methylphenol	95-48-7	10	330
bis(2-Chloroisopropyl) ether	108-60-1	10	330
4-Methylphenol	106-44-5	10	330
N-Nitroso-di-n-dipropylamine	621-64-7	10	330
Hexachloroethane	67-72-1	10	330
Nitrobenzene	98-95-3	10	330
Isophorone	78-59-1	10	330
2-Nitrophenol	88-75-5	10	330
2,4-Dimethylphenol	105-67-9	10	330
Benzoic Acid	65-85-0	25	800
bis(2-Chloroethoxy)methane	111-91-1	10	330
2,4-Dichlorophenol	120-83-2	10	330
1,2,4-Trichlorobenzene	120-82-1	10	330
Naphthalene	91-20-3	10	330
4-Chloroaniline	106-47-8	10	330
Hexachlorobutadiene	87-68-3	10	330
4-Chloro-3-methylphenol	59-50-7	10	330
2-Methylnaphthalene	91-57-6	10	330
Hexachlorocyclopentadiene	77-47-4	10	330
2,4,6-Trichlorophenol	88-06-2	10	330
2,4,5-Trichlorophenol	95-95-4	25	800
2-Chloronaphthalene	91-58-7	10	330
2-Nitroaniline	88-74-4	25	800
Dimethylphthalate	131-11-3	10	330
Acenaphthylene	208-96-8	10	330

Table 2-2 (Cont.)

CONTRACT LABORATORY PROGRAM
TARGET COMPOUND LIST
SEMIVOLATILE QUANTITATION LIMITS

Compound	CAS #	Water	Soil Sediment
2,6-Dinitrotoluene	606-20-2	10 ug/L	330 ug/kg
3-Nitroaniline	99-09-2	25	800
Acenaphthene	83-32-9	10	330
2,4-Dinitrophenol	51-28-5	25	800
4-Nitrophenol	100-02-7	25	800
Dibenzofuran	132-64-9	10	330
2,4-Dinitrotoluene	121-14-2	10	330
Diethylphthalate	84-66-2	10	330
4-Chlorophenyl-phenyl ether	7005-72-3	10	330
Fluorene	86-73-7	10	330
4-Nitroaniline	100-01-6	25	800
4,6-Dinitro-2-methylphenol	534-52-1	25	800
N-nitrosodiphenylamine	86-30-6	10	330
4-Bromophenyl-phenylether	101-55-3	10	330
Hexachlorobenzene	118-74-1	10	330
Pentachlorophenol	87-86-5	25	800
Phenanthrene	85-01-8	10	330
Anthracene	120-12-7	10	330
Di-n-butylphthalate	84-74-2	10	330
Fluoranthene	206-44-0	10	330
Pyrene	129-00-0	10	330
Butylbenzylphthalate	85-68-7	10	330
3,3'-Dichlorobenzidine	91-94-1	10	330
Benzo(a)anthracene	56-55-3	10	330
Chrysene	218-01-9	10	330
bis(2-Ethylhexyl)phthalate	117-81-7	10	330
Di-n-octylphthalate	117-84-0	10	330
Benzo(b)fluoranthene	205-99-2	10	330
Benzo(k)fluoranthene	207-08-9	10	330
Benzo(a)pyrene	50-32-8	10	330
Indeno(1,2,3-cd)pyrene	193-39-5	10	330
Dibenzo(a,h)anthracene	53-70-3	10	330
Benzo(g,h,i)perylene	191-24-2	10	330

Table 2-2 (Cont.)

CONTRACT LABORATORY PROGRAM
TARGET COMPOUND LIST
PESTICIDE AND PCB QUANTITATION LIMITS

Compound	CAS #	Water	Soil Sediment
alpha-BHC	319-84-6	0.05 ug/L	1.7 ug/kg
beta-BHC	319-85-7	0.05	1.7
delta-BHC	319-86-8	0.05	1.7
gamma-BHC (Lindane)	58-89-9	0.05	1.7
Heptachlor	76-44-8	0.05	1.7
Aldrin	309-00-2	0.05	1.7
Heptachlor epoxide	1024-57-3	0.05	1.7
Endosulfan I	959-98-8	0.05	1.7
Dieldrin	60-57-1	0.10	3.3
4,4'-DDE	72-55-9	0.10	3.3
Endrin	72-20-8	0.10	3.3
Endosulfan II	33213-65-9	0.10	3.3
4,4'-DDD	72-54-8	0.10	3.3
Endosulfan sulfate	1031-07-8	0.10	3.3
4,4'-DDT	50-29-3	0.10	3.3
Methoxychlor (Mariate)	72-43-5	0.5	17
Endrin ketone	53494-70-5	0.10	3.3
alpha-Chlordane	5103-71-9	0.5	1.7
gamma-chlordane	5103-74-2	0.5	1.7
Toxaphene	8001-35-2	5.0	170
Aroclor-1016	12674-11-2	1.0	33
Aroclor-1221	11104-28-2	2.0	67
Aroclor-1232	11141-16-5	1.0	33
Aroclor-1242	53469-21-9	1.0	33
Aroclor-1248	12672-29-6	1.0	33
Aroclor-1254	11097-69-1	1.0	33
Aroclor-1260	11096-82-5	1.0	33

7838:1

Table 2-3

CONTRACT LABORATORY PROGRAM
TARGET ANALYTE LIST
QUANTITATION LIMITS

Compound	Procedure	Water	Soil Sediment
Aluminum	ICP	200 ug/L	40 mg/kg
Antimony	Furnace	60	12
Arsenic	Furnace	10	2
Barium	ICP	200	40
Beryllium	ICP	5	1
Cadmium	ICP	5	1
Calcium	ICP	5000	1000
Chromium	ICP	10	2
Cobalt	ICP	50	10
Copper	ICP	25	5
Iron	ICP	100	20
Lead	Furnace	3	0.6
Magnesium	ICP	5000	1000
Manganese	ICP	15	3
Mercury	Cold Vapor	0.2	0.2
Nickel	ICP	40	8
Potassium	ICP	5000	1000
Selenium	Furnace	5	1
Silver	ICP	10	2
Sodium	ICP	5000	1000
Thallium	Furnace	10	2
Vanadium	ICP	50	10
Zinc	ICP	20	4

7838:1

Table 2-4

PHASE II MONITORING WELLS

Well Number	Boring Depth (feet)	Drilling Method	Screened Interval (feet below ground surface)	Date Completed
MW02BR	169	MR	158.9 - 168.9	10/20/91
MW08BR	145	MR	126 - 136	10/31/91
MW27S	20	HS	8 - 18	10/05/91
MW27I	56	HS	43.1 - 53.1	10/17/91
MW28S	20	HS	8.5 - 18.5	10/05/91
MW28I	55	HS	43 - 53	10/18/91
MW29S	20	HS	8 - 18	10/05/91
MW29I	50	HS	35.3 - 45.3	10/09/91
MW30S	20	HS	8 - 18	10/06/91
MW30I	55	HS	42.7 - 52.7	10/06/91
MW30D	107	HS	94.7 - 104.7	10/20/91
MW30BR	149	MR	137 - 147	10/16/91
MW31S	20	HS	8.5 - 18.5	10/07/91
MW31I	53	HS	42 - 52	10/18/91
MW32S	30	HS	18 - 28	10/15/91
MW32I	51.5	HS	40 - 50	10/15/91
MW33S	27	HS	16.5 - 26.5	10/16/91
MW33I	47	HS	35 - 45	10/16/91
MW34I	50.5	HS	40 - 50	10/19/91
MW35S	30.5	HS	20 - 30	10/19/91
MW36I	57	HS	45 - 55	10/21/91
MW37S	23.5	HS	12 - 22	10/22/91
MW37D	101	MR	90 - 100	10/29/91
MW38S	23	HS	11 - 21	10/22/91
MW38D	103	HS	90 - 100	10/31/91
MW39	31	HS	20 - 30	10/28/91

Table 2-4

PHASE II MONITORING WELLS

Well Number	Boring Depth (feet)	Drilling Method	Screened Interval (feet below ground surface)	Date Completed
MW40	31	HS	20 - 30	10/28/91
MW41	76	HS	65 - 75	10/28/91
MW42I	52	HS	40.1 - 50.1	10/30/91
MW43S	17	HS	6 - 16	10/30/91
MW43BR	158.5	MR	146.5 - 156.5	11/03/91
MW44D	125	MR	115 - 125	11/05/91

Key:

MR Mud rotary.
HS Hollow-stem auger.

Table 2-5

GROUNDWATER ELEVATIONS
APRIL 27 AND 28, 1992

Well ID	Top of Inner Casing Elevation (feet above mean sea level)	Depth to Water (feet)	Water Level Elevation (feet above mean sea level)
MW01	740.87	13.48	727.39
MW02S	742.44	13.99	728.45
MW02D	742.30	13.91	728.39
MW02BR	742.53	14.09	728.44
MW03	738.80	8.78	730.02
MW04S	740.80	16.87	723.93
MW04D	741.24	17.44	723.80
MW05S	734.86	NM	--
MW05D	734.13	NM	--
MW06	740.18	NM	--
MW07	731.64	13.04	718.60
MW08S	734.60	15.73	718.87
MW08D	734.61	15.86	718.75
MW08BR	734.79	16.02	718.77
MW09	740.43	NM	--
MW10S	728.70	11.21	717.49
MW10D	728.26	7.65	720.61
MW11	739.50	DRY	--
MW11D	739.28	16.55	722.73
MW12	741.59	11.04	730.55
MW13S	750.20	11.92	738.28
MW13D	750.50	12.21	738.29
MW14	740.87	6.11	734.76
MW15	742.44	5.09	737.35
MW16	743.51	5.09	738.42

Table 2-5

GROUNDWATER ELEVATIONS
APRIL 27 AND 28, 1992

Well ID	Top of Inner Casing Elevation (feet above mean sea level)	Depth to Water (feet)	Water Level Elevation (feet above mean sea level)
MW18	747.18	5.69	741.49
MW19S	752.30	13.12	739.18
MW19D	752.37	13.13	739.24
MW20S	748.41	12.84	735.57
MW20D	748.65	12.61	736.04
MW21S	754.83	13.91	740.92
MW21D	754.87	14.06	740.81
MW23S	741.82	8.18	733.64
MW23D	742.29	9.49	732.80
MW24	745.12	10.19	734.93
MW25	743.72	9.33	734.39
MW26	752.02	15.29	736.73
MW27S	751.87	11.09	740.78
MW27I	752.13	11.78	740.35
MW28S	750.83	11.77	739.06
MW28I	750.91	12.09	738.82
MW29S	751.77	10.89	740.88
MW29I	752.37	11.50	740.87
MW30S	748.13	9.04	739.09
MW30I	748.18	9.76	738.42
MW30D	748.09	9.67	738.42
MW30BR	747.94	9.53	738.41
MW31S	751.45	10.89	740.56
MW31I	751.82	11.30	740.52
MW32S	746.99	6.89	740.10

Table 2-5

GROUNDWATER ELEVATIONS
APRIL 27 AND 28, 1992

Well ID	Top of Inner Casing Elevation (feet above mean sea level)	Depth to Water (feet)	Water Level Elevation (feet above mean sea level)
MW32I	746.93	6.94	739.99
MW33S	745.40	7.37	738.03
MW33I	745.31	7.55	737.76
MW34I	744.33	9.14	735.19
MW35	748.50	7.62	740.88
MW36I	747.04	8.07	738.97
MW37S	741.47	16.17	725.30
MW37D	741.36	16.03	725.33
MW38S	737.15	15.36	721.79
MW38D	736.84	15.05	721.79
MW39	752.88	13.63	739.25
MW40	753.40	14.24	739.16
MW41D	741.55	7.44	734.11
MW42I	742.19	10.30	731.89
MW43S	728.92	7.53	721.39
MW43BR	728.60	9.03	719.57
MW44D	739.71	16.62	723.09
RIVER	736.21	20.28	715.93

Key:

NM Not measured
-- Not determined

Table 2-6

PHASE II GROUNDWATER SAMPLES

Monitoring Well	Date Sampled	VOA	ABN	Total Metals	SAS*
MW01	12/03/91	a	--	--	--
MW02S	12/05/91	a	a	b	cD
MW2D	12/05/91	a	--	--	--
MW02BR	12/05/91	a	--	--	--
MW03	12/03/91	a	--	--	--
MW04S	12/02/91	a	--	--	--
MW04D	12/03/91	a	--	--	--
MW05S	NA	NA	NA	NA	NA
MW05D	NA	NA	NA	NA	NA
MW06	NA	NA	NA	NA	NA
MW07	12/03/91	a	--	--	--
MW08S	12/04/91	a	--	--	--
MW08D	12/04/91	a	--	--	--
MW08BR	12/04/91	a	--	--	--
MW09	NA	NA	NA	NA	--
MW10S	12/02/91	aD	--	--	--
MW10D	12/02/91	a	--	--	--
MW11S	12/02/91	a	--	--	--
MW11D	12/02/91	a	--	--	--
MW11S	12/02/91	a	--	--	--
MW012	12/04/91	a	--	--	--
MW013S	12/02/91	a	--	--	--
MW13D	12/02/91	a	--	--	--
MW14	12/04/91	a	--	--	--
MW15	12/04/91	a	--	--	--
MW16	12/04/91	a	--	--	--
MW18	12/06/91	a	--	--	--

Table 2-6

PHASE II GROUNDWATER SAMPLES

Monitoring Well	Date Sampled	VOA	ABN	Total Metals	SAS*
MW19S	12/04/91	aD	--	--	--
MW19D	12/04/91	a	--	--	--
MW20S	12/04/91	a	--	--	--
MW21D	12/04/91	a	--	--	--
MW21S	12/03/91	a	--	--	--
MW21D	12/03/91	a	--	--	--
MW23S	12/03/91	a	--	--	c
MW23D	12/04/91	aD	--	--	--
MW24	12/05/91	a	--	--	--
MW25	12/05/91	a	--	--	--
MW26	12/05/91	aD	--	--	--
MW27S	12/03/91	a	--	b	--
MW27I	12/03/91	a	a	--	--
MW28S	12/03/91	a	--	--	--
MW28I	12/03/91	aD	--	--	--
MW29S	12/03/91	a	--	--	--
MW29I	12/03/91	a	--	--	--
MW30S	12/05/91	aD	a	b	c
MW30I	12/05/91	a	--	--	c
MW30D	12/06/91	a	--	--	--
MW30BR	12/06/91	a	--	--	--
MW31S	12/03/91	a	--	--	--
MW31I	12/03/91	a	--	--	--
MW32S	12/06/91	aD	--	--	--
MW32I	12/06/91	a	--	--	--
MW33S	12/06/91	a	--	--	--
MW33I	12/06/91	a	--	--	--

Table 2-6

PHASE II GROUNDWATER SAMPLES

Monitoring Well	Date Sampled	VOA	ABN	Total Metals	SAS*
MW34I	12/05/91	a	–	–	–
MW35S	12/03/91	a	–	–	–
MW36I	12/06/91	a	–	–	–
MW37S	12/05/91	a	–	–	–
MW37D	12/05/91	a	–	–	c
MW38S	12/05/91	a	–	–	–
MW38D	12/05/91	a	–	–	–
MW39	12/04/91	a	a	b	–
MW40	12/04/91	a	–	–	–
MW41	12/04/91	a	aD	bD	–
MW42I	12/04/91	a	a	b	–
MW43S	12/05/91	a	–	–	–
MW43BR	12/05/91	a	–	–	–
MW44D	12/05/91	a	–	–	–

Key:

- * Special Analytical Services included the following analyses in full or in part: Biological Oxygen Demand, Chemical Oxygen Demand, Nitrate and Nitrite, Oil and Grease, Total Alkalinity, Total Dissolved Solids, Total Organic Carbon, and Total Suspended Solids.
- a Pace Laboratory
- b Keytox Laboratory
- c Centec Laboratory
- – Sample was not collected for analysis.
- D Duplicate sample
- NA Not accessible

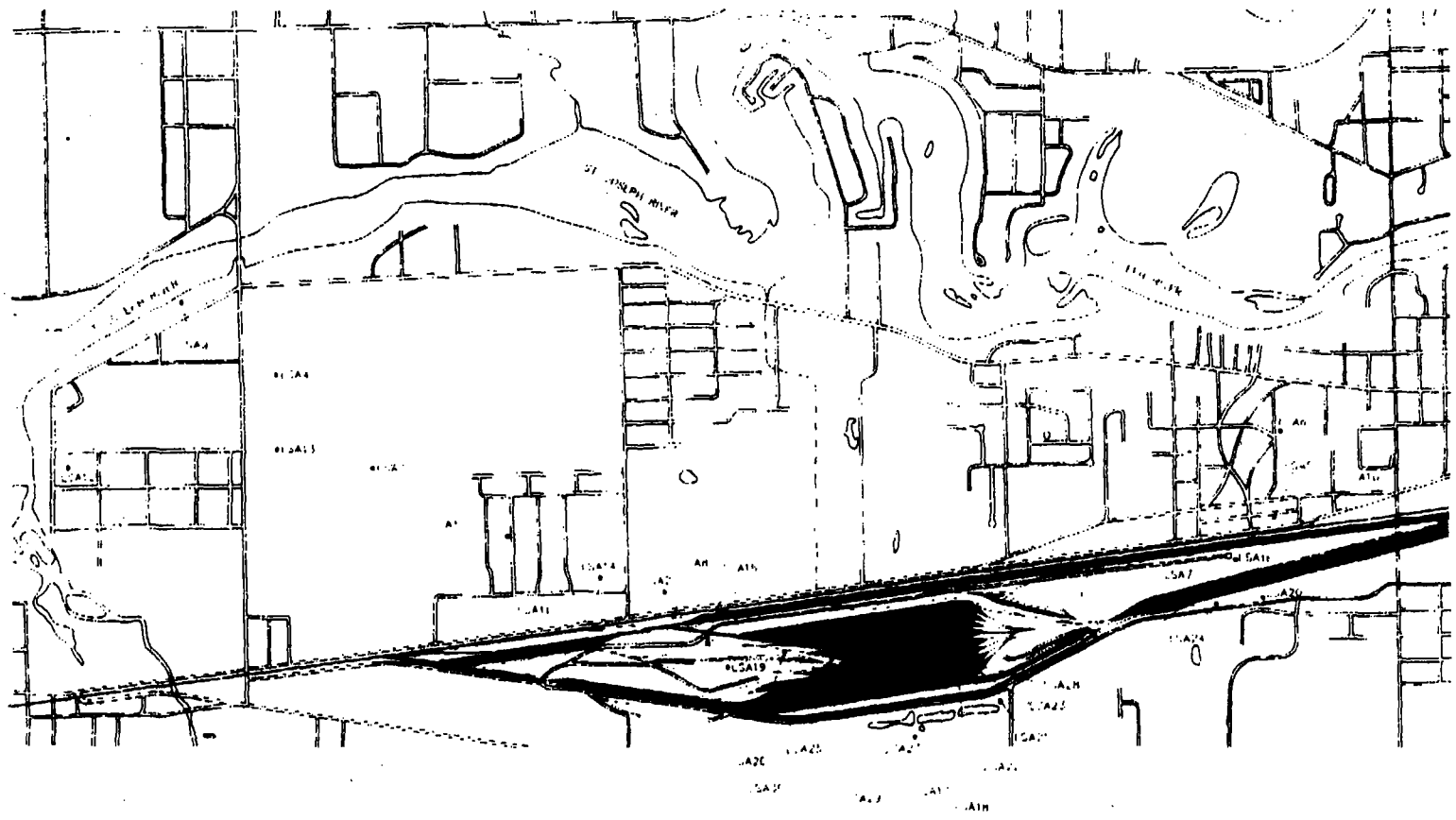


FIGURE 2-1 LEAD-SCREEN AUGER BORING LOCATIONS MAP

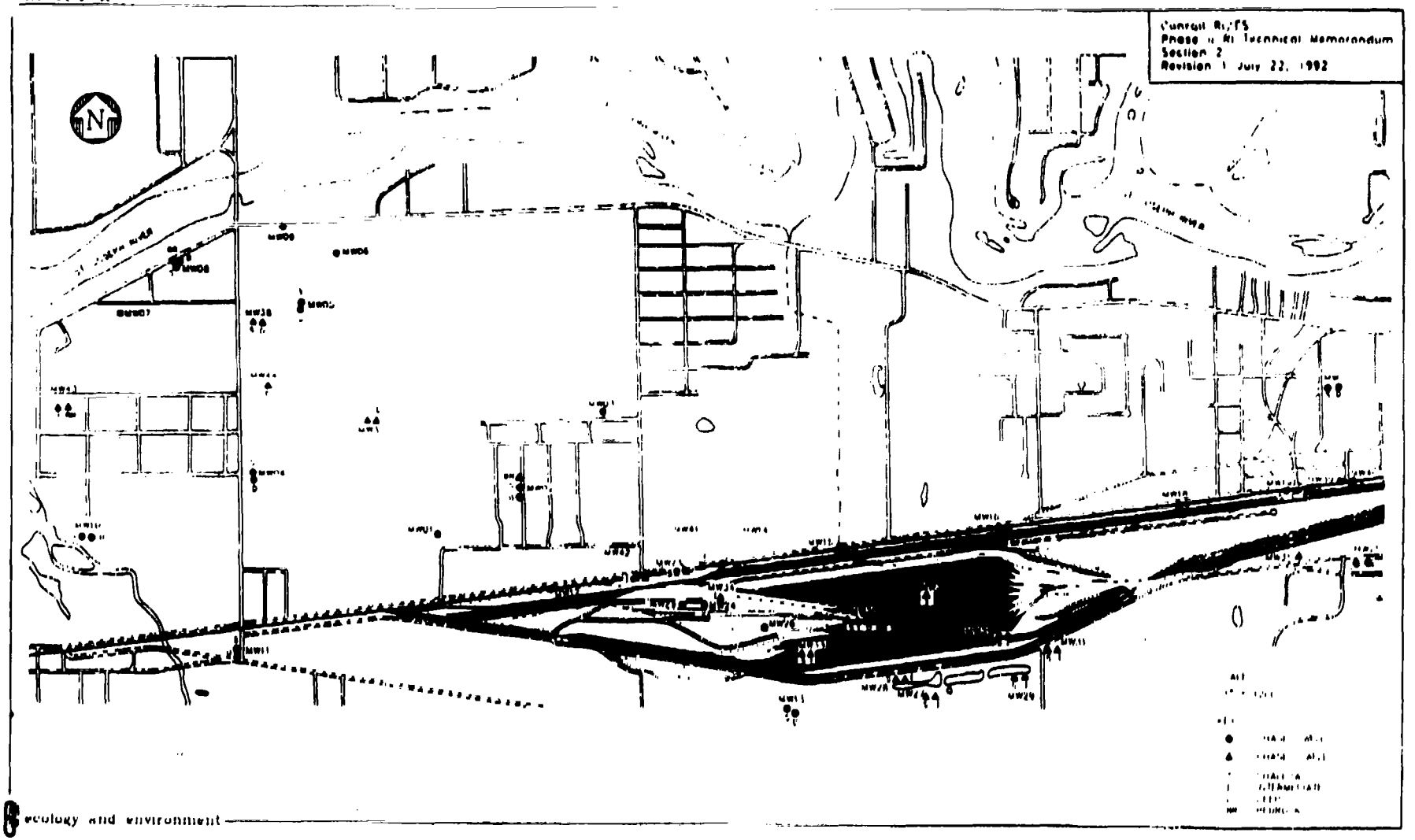


FIGURE 2-2 PHASE I AND II MONITORING WELL LOCATIONS MAP

3. PHYSICAL RESULTS AND DISCUSSION

3.1 SITE GEOLOGY

This section briefly summarizes geotechnical information and data collected during the Phase II RI. The geologic information collected during the drilling of the monitoring well borings and soil borings along with data collected from slug tests is used to describe the geologic and hydrologic conditions present in the study area.

The results of the subsurface soil investigation during the Phase II RI show that the study area consists of unstratified sand and gravel glacial outwash deposits (see Appendices B and D for drilling logs). At numerous locations in the study area, clay and silt units were present at thicknesses typically ranging from 1 to 5 feet and at depths to 40 feet BGS. Three locations, monitoring well borings MW31, MW36, and soil boring B27, represent exceptions to this generalization. Monitoring well locations MW31 and MW36 were characterized by 7½ and 13 feet of dark gray clay, respectively. Sixteen and one-half feet of brown silt was encountered during drilling of soil boring B27. In all three of these cases, adjacent soil borings or monitoring well borings show no silt or clay that can be correlated with respect to depth, thickness, color, and grain size. Correlation of the lateral continuity of thinner clay and silt units from other locations showed that the silt and clay units are present as discrete lenses and that no clay or silt unit is continuous throughout the study area. Comparison of the Phase II drilling logs to the results of the Phase I study confirms the apparent absence of clay in the County Road 1 area, throughout an area trending northwest-southeast across the study area. Figure 3-1 is a cross section from A-A' along a line bearing approximately northwest to southeast, from monitoring well location MW08 to MW31, which shows the variability of the subsurface unconsolidated

glacial material. The geologic cross section shows brown sand as the most abundant aquifer material. Although the grain size ranges from very fine sand to very coarse sand, there is no evidence of a trend or systematic grading in the grain size of the sand. Figure 3-1 and Appendices B and D clearly show that there is no continuous confining layer present in the study area. Dark gray clayey silt was encountered at a depth of approximately 136 feet BGS during drilling of MW08BR. It is not known whether this unit extends to bedrock. The other three bedrock wells were drilled until bedrock was encountered. In these cases, neither clay nor boulders were found on the bedrock surface.

The bedrock consists of the Coldwater Shale of Mississippian age and the Sunbury and the Ellsworth Shales of Devonian and Mississippian age (Imbrigiotta and Martin 1981). Shale was encountered in three wells: MW02BR, MW30BR, and MW43BR. Because the bedrock was reached at only three locations, the surface topography of the shale cannot be described in detail. These three bedrock wells are located roughly in a line, and, as a result, only the apparent dip of the bedrock surface can be determined. The elevations at which bedrock was encountered are 569.3 feet above MSL at MW43BR, 571 feet above MSL at MW02BR, and 599.5 feet above MSL at MW30BR; this is a range of 148.5 to 169 feet BGS. The greatest observed dip of the bedrock surface, between locations MW30BR and MW02BR, is less than 0.6 percent to the northwest. Without the benefit of additional data, this seems to indicate that the bedrock is essentially horizontal under the study area. The preglacial bedrock valley postulated by Imbrigiotta and Martin to extend into the study area is not present, as evidenced by the relatively high elevation of bedrock at MW30BR.

3.2 SITE HYDROGEOLOGY

From E & E observations made during drilling of the soil borings and installation of monitoring wells, the depth to the water table in the study area ranges from 6 to 15 feet BGS. Water level measurement data that were collected on the Phase I and Phase II wells are presented in Table 2-5. Water levels in the wells systematically average approximately 1.5 feet higher than water levels collected during the Phase I RI. The St. Joseph River elevation during the Phase II measurements was approximately 0.7 feet lower than that measured during Phase I. Although all water level measurements are roughly comparable with respect to season, the 1.5-foot difference between Phase I and Phase II measurements is interpreted as reflecting a normal fluctuation in the hydrologic cycle.

Shallow, intermediate, and deep potentiometric surface maps were constructed to interpret the current groundwater flow patterns (Figures 3-2, 3-3, and 3-4, respectively). The maps were constructed using the data from Table 2-5 to enable comparison of three zones in the unconfined aquifer. The aquifer is divided into monitoring zones as a means to interpret the physical and chemical hydrogeology. Although groundwater elevation data collected on December 2, 1991 are not presented, groundwater flow patterns are very similar to flow patterns constructed from April 27 and 28, 1992, data. The general flow direction in all three zones is northwest. For the shallow zone, monitoring well MW43S indicates the presence of a groundwater mound. This is probably the result of the existence of clayey silt extending from approximately 14 to 18 feet BGS. The well screen of MW43S is located 6 to 16 feet BGS. Because of the absence of shallow monitoring wells in the vicinity of this groundwater mound, the flow regime near MW43S is not well understood. In the LaRue Street area, the general flow direction is north due to the groundwater's greater proximity and, therefore, discharge to the St. Joseph River. The shape of the potentiometric contour lines and thus the direction of groundwater flow is essentially the same as that determined during Phase I. The average Phase II horizontal groundwater gradient is 0.0018 ft/ft for the shallow zone, 0.0018 ft/ft for the intermediate zone, and 0.0019 ft/ft for the deep zone, which are also in agreement with the reported Phase I results.

Table 3-1 lists the vertical hydraulic gradients. Vertical hydraulic gradients were calculated using the water level measurements from the well nests. The gradients were calculated for the two measurement dates and both hydraulic gradient data sets are shown for comparison in Table 3-1. These results show a general downward gradient (as evidenced by the "+" signs) in the study area. The vertical gradient values range from -.05032 ft/ft for the MW10S/D well nest to +.06486 ft/ft for the MW33S/I well nest. The shallow/deep well nests MW10S/D, MW19S/D, and MW20S/D are relatively close to the river and show a small upward gradient. This is generally the case for shallow/deep wells near Baugo Bay and the St. Joseph River, except for MW08S/D and MW11S/D. The vertical hydraulic gradients and the respective locations of the wells in the study area are consistent with groundwater recharge in the railyard and subsequent groundwater discharge to the St. Joseph River.

3.3 SLUG TESTS

The results of the slug tests are listed in Table 3-2. The data were interpreted using a computer software package, SLUGIX™ (Interpex Limited 1990). Options selected in this package included the Hvorslev method for unconfined aquifers and the first-order assumption that the lateral and vertical permeabilities have a ratio of 1 in the vicinity of the well screen. The results range from 9.6×10^{-5} ft/sec to 3.5×10^{-3} ft/sec and have a geometric mean of 8.0×10^{-4} ft/sec. The range of values is typical for unconsolidated silty sand, clean sand, and gravel (Freeze and Cherry 1979). Also, the greater than one order of magnitude difference between the high and low values reflects the range of aquifer materials observed during the geologic logging of soil and monitoring well borings. Of the 12 wells tested, the four lowest hydraulic conductivity values were obtained for the wells that were installed using the mud rotary drilling technique. The remaining eight wells tested were installed using the hollow-stem auger drilling technique. The Phase II slug test results are consistent with Phase I results, although the Phase I data show a greater range towards lower conductivity values.

Table 3-1

VERTICAL HYDRAULIC GRADIENTS

Well Nos.	December 2, 1991	April 27-28, 1992
Shallow/Intermediate Nest		
MW27S-MW27I	+.01510	+.01225
MW28S-MW28I	+.00783	+.00696
MW29S-MW29I	+.00037	+.00037
MW30S-MW30I	+.01931	+.01931
MW31S-MW31I	+.00119	+.00119
MW32S-MW32I	+.00045	+.00500
MW33S-MW33I	+.06486	+.01459
Shallow/Deep Nest		
MW02S-MW02D	+.00103	+.00103
MW04S-MW04D	+.00261	+.00377
MW08S-MW08D	+.00194	+.00233
MW10S-MW10D	-.05032	-.05032
MW11S-MW11D	+.00067	N/A
MW13S-MW13D	-.00055	-.00018
MW19S-MW19D	-.00044	-.00133
MW20S-MW20D	-.00055	-.00855
MW21S-MW21D	+.00158	+.00218
MW23S-MW23D	+.01582	+.01527
MW30S-MW30D	+.00796	+.00773
MW37S-MW37D	-.00038	-.00038
MW38S-MW38D	+.00013	+.00000
Shallow/Bedrock Nest		
MW02S-MW02BR	+.00000	+.00007
MW08S-MW08BR	+.00113	+.00094

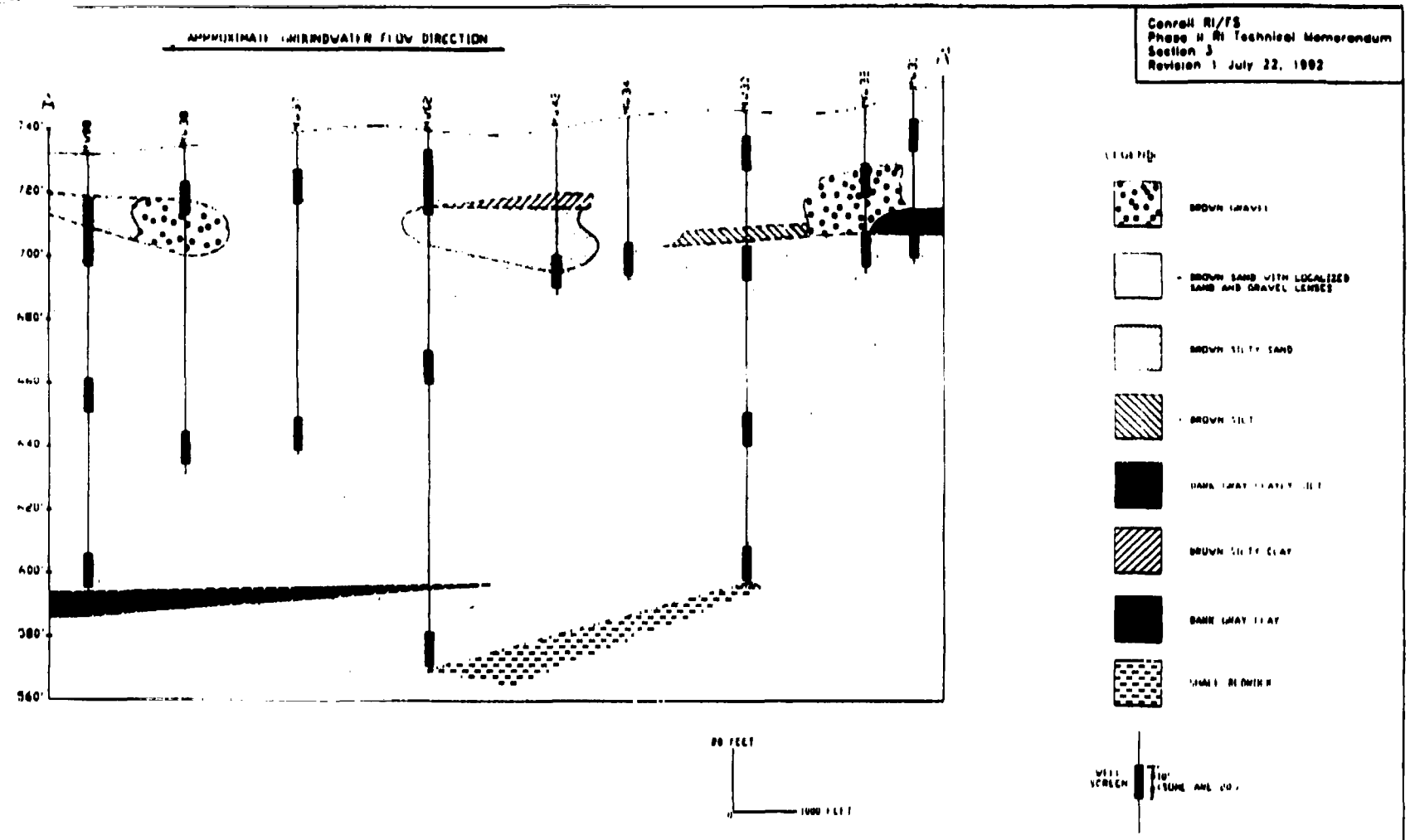
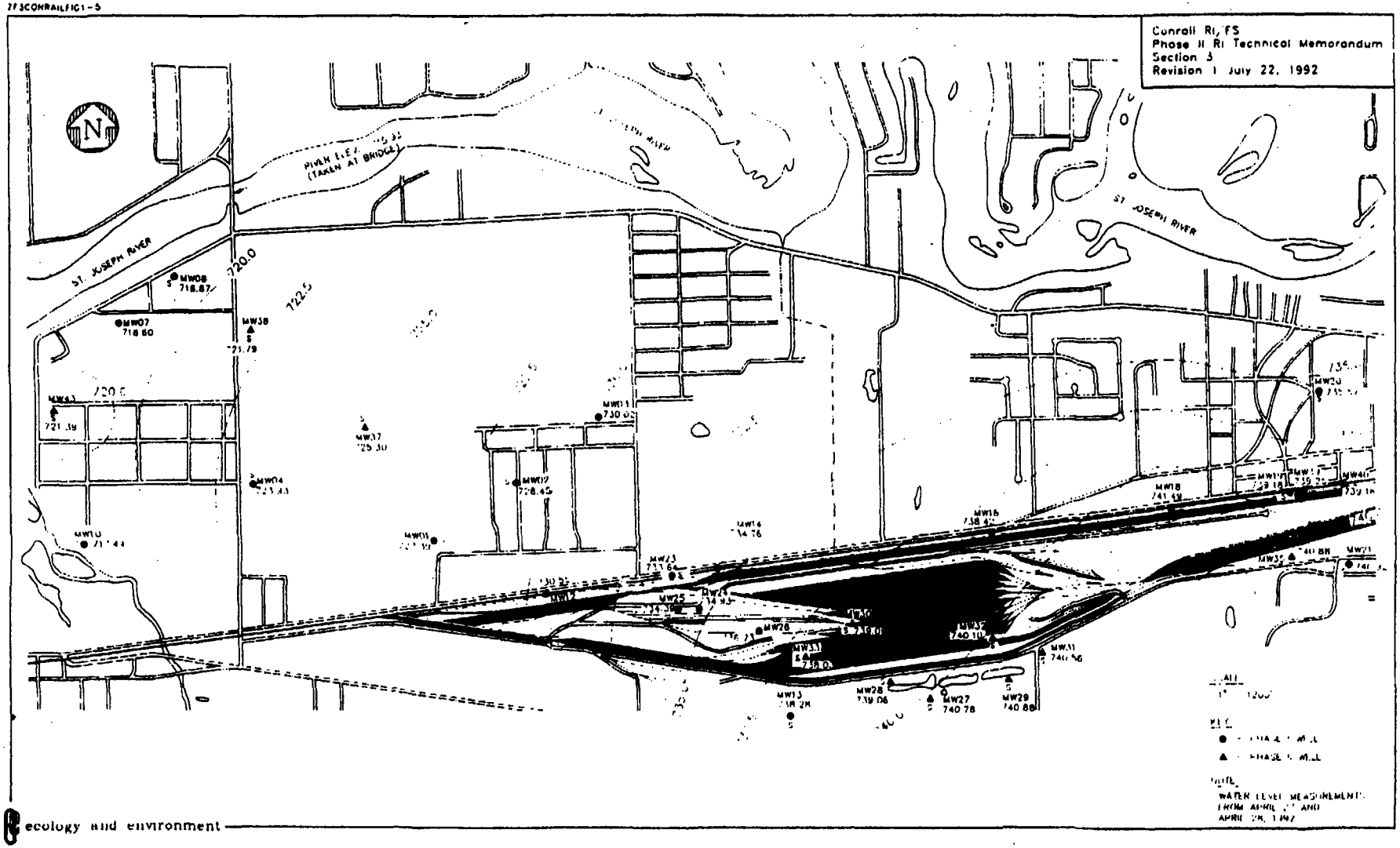


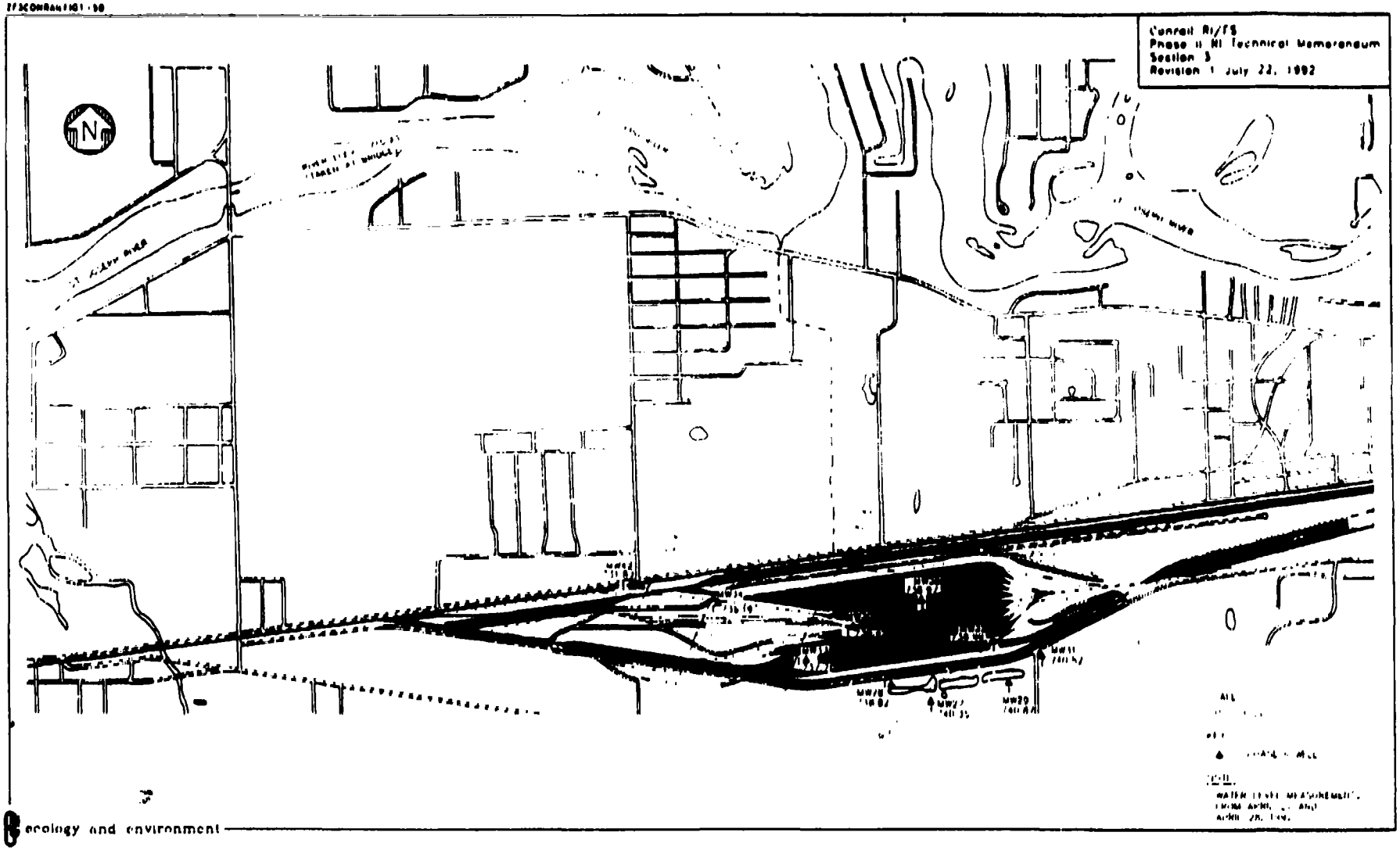
FIGURE 3-1 GEOLOGIC CROSS SECTION A-A'

7F3CONRAIL\FIG1-5



ecology and environment

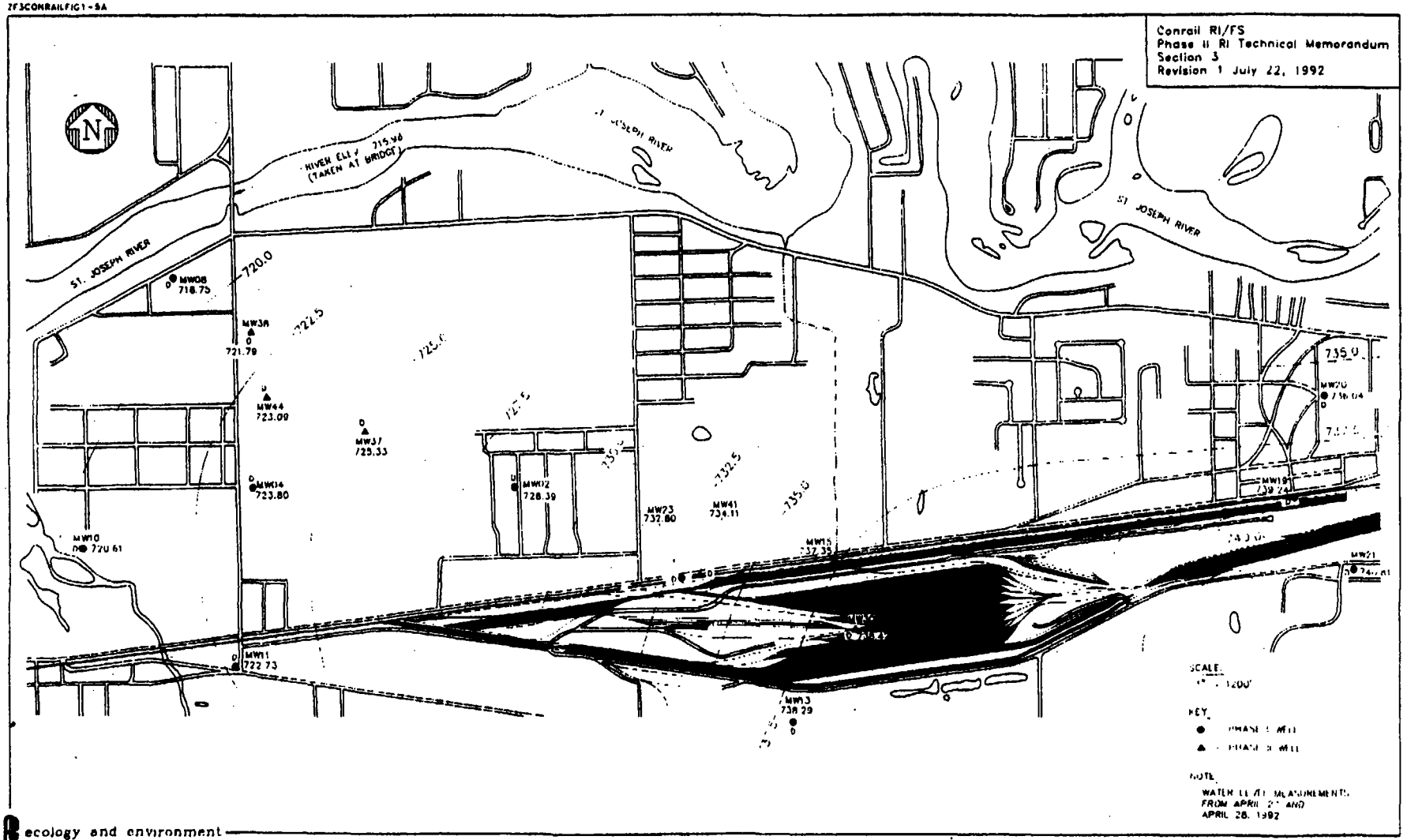
FIGURE 3-2 GROUNDWATER TABLE SURFACE MAP



ecology and environment

FIGURE 3-3 INTERMEDIATE GROUNDWATER POTENTIOMETRIC SURFACE MAP

ZF3CONRAILFIG1-5A



ecology and environment

FIGURE 3-4 DEEP GROUNDWATER POTENTIOMETRIC SURFACE MAP

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4. ANALYTICAL RESULTS AND DISCUSSION

4.1 LEAD-SCREEN AUGER SAMPLING

This section summarizes the analytical results of the groundwater samples collected from the 30 LSA borings completed as part of the Phase II RI at the Conrail railyard and surrounding study area. CCl_4 results are presented and discussed first, followed by TCE results. The analytical results of these groundwater samples are provided in Appendix A. The locations of the LSA borings are presented in Figure 2-1.

4.1.1 CCl_4 Results

Figure 4-1 presents the section line for cross section B-B' trending northwest-southeast through the study area and Conrail railyard. Plate 2 presents the cross section B-B' showing the concentration contours of CCl_4 within the aquifer in the direction of groundwater flow.

LSAs 21 and 27 (LSA 27 not included on cross section) were upgradient of the classification yard on the railyard based on groundwater flow direction. These borings were located to identify potential sources of CCl_4 upgradient of the railyard. CCl_4 was not detected in either LSA 21 or LSA 27 to completion depths of 140 and 83 feet, respectively. These data indicate that there are no sources of CCl_4 upgradient of the railyard contributing to the CCl_4 groundwater contamination identified downgradient of these locations.

On the Conrail railyard, five LSA borings (LSAs 17, 18, 22, 23, and 28) were drilled along the eastern end of track 69 to preliminarily identify the location of the CCl_4 tankcar spill. CCl_4 was detected in LSAs 22 and 23, with the highest concentrations found in LSA

23. In LSA 23, the CCl_4 concentration revealed very low level of contamination to a depth of 18 feet. A significant increase in CCl_4 contamination was detected in the 18- to 23-foot (5,100 µg/L) and 23- to 28-foot depth interval (>9,100 µg/L) samples, the highest detected concentrations throughout the study area. The contamination gradually decreased from 28 feet to the end of the boring at 38 feet BGS, where CCl_4 was detected at 560 µg/L. The vertical extent of this CCl_4 contamination is not yet determined. These analytical results show that a source of CCl_4 groundwater contamination is located in the vicinity of LSA 23.

LSA 30, located 2,400 feet west of LSA 23, also revealed significant CCl_4 concentrations in the groundwater. LSA 30 was drilled to a depth of 26 feet, where an unknown subsurface obstruction caused auger refusal. Groundwater samples from this boring revealed no detectable levels of contamination until the 21- to 26-foot sample interval, where CCl_4 was detected at a concentration of 3,100 µg/L. The analytical results of groundwater samples at this location also show a source of CCl_4 in the southwest portion of the classification yard on the railyard.

LSA borings 25 and 26, located on the Conrail railyard, advanced to 148 and 93 feet BGS, respectively, revealed very low or nondetectable concentrations of CCl_4 in the groundwater samples throughout the length of the borings. LSA 25 was drilled to the top of bedrock. The CCl_4 plumes originating near LSA 23 and LSA 30 may be passing north and south of LSAs 25 and 26, respectively. LSA 19 (not included on cross section), located on the Conrail railyard, revealed relatively low concentrations of CCl_4 ranging from 19 µg/L (13- to 18-foot interval sample) to 41 µg/L (33- to 38-foot interval sample), which may be attributable to the CCl_4 source areas identified based on LSA data.

Immediately off-site and downgradient of the Conrail railyard, groundwater samples from LSA 11 (located on the southwest corner of the intersection of U.S. 33 and County Road 1), showed CCl_4 concentrations in every interval sampled to the final boring depth of 93 feet. In this boring, the highest concentrations of CCl_4, ranging from 160 µg/L to 330 µg/L, were detected in groundwater samples collected between 23 and 53 feet BGS. Further east on U.S. 33, in LSA 8 (not included on cross section), CCl_4 was detected (74 µg/L) at the 53- to 58-foot sample interval. The CCl_4 groundwater contamination plume was effectively tracked from LSA 11, to the northwest, into the County Road 1 residential area via LSA borings 14 and 1. LSA borings 14 and 1 each were drilled to 148 feet BGS.

A concentration of approximately 100 µg/L was detected in both LSA borings at a depth of approximately 35 feet. The CCl_4 concentrations begin to spread vertically in LSA 1 with concentrations of approximately 100 µg/L to a depth of 98 feet. This spreading is thought to be the result of the downward vertical gradient in the area.

Further downgradient in the direction of groundwater flow, LSA 3 was located between County Road 1 and Vistula Avenue residential areas in order to investigate the potential link between the CCl_4 contamination source(s) on the Conrail railyard and the CCl_4 contamination previously identified in the Vistula Avenue area. In this boring, CCl_4 was detected in every sample collected throughout the profile to a completion depth of 143 feet. A concentration of approximately 100 µg/L was detected at a depth of 35 feet. CCl_4 concentrations ranged from 110 µg/L to 500 µg/L between 35 and 113 feet BGS. CCl_4 concentrations detected deeper in this boring are thought to be the result of the downward vertical gradient in the area. The CCl_4 concentrations detected in groundwater samples between these depths are higher, on average, than levels detected in the County Road 1 area. The groundwater contamination plume is tracked from the County Road 1 area to this midpoint between residential areas.

LSA 4 was located in the path of groundwater contamination, upgradient of Vistula Avenue contamination area, in order to further establish the link between groundwater contamination in the Vistula Avenue and County Road 1 areas. The groundwater sample collected from the 18- to 23-foot interval in this boring revealed CCl_4 at a concentration of 420 µg/L. The concentration of CCl_4 quickly decreases with depth and was not detectable at a depth of approximately 48 feet. CCl_4 was detected again in this boring in the groundwater sample from the 68- to 73-foot interval at a concentration of 190 µg/L. From this interval, the concentrations steadily increase with depth, reaching a maximum concentration of 1,900 µg/L at 93 feet BGS. CCl_4 concentrations of $>1{,}000$ µg/L were detected to a depth of 113 feet. From 113 feet to the end of the boring at 143 feet BGS, CCl_4 concentrations steadily decrease.

By comparing the groundwater results from LSA 4 to the results from LSA 3, two facts are revealed. First, in LSA 4, CCl_4 was detected near the water table at a much higher concentration (420 µg/L) than found at a similar depth in LSA 3 (22 µg/L). The known downward vertical gradient in the area coupled with the undetected CCl_4 zone between 48 and 68 feet BGS in LSA 4 suggests contribution from a potential shallow CCl_4

source. Second, the high levels of CCl_4 detected deeper in LSA 4 are a continuation of the plume originating from a source on the Conrail railyard. The very high levels of CCl_4 detected between 93 and 113 feet BGS represent the center of CCl_4 contaminant mass within the plume. The distribution pattern of CCl_4 throughout the plume, particularly the identified elliptically shaped center of mass with lower CCl_4 concentrations concentrically surrounding it, is indicative of the progression of a contaminant slug from a one-time point source (Fetter 1980). The plume in this area has a downward trend, again thought to be the result of the downward vertical gradient in the area. LSA 13 (not included on cross section) also revealed CCl_4 deeper in the boring (between 93 and 138 feet BGS) at concentrations ranging from 15 µg/L to 730 µg/L.

LSA 9 was located within the path of the groundwater CCl_4 plume and along the St. Joseph River to determine whether the plume reached the river and if so, at what relative concentrations. CCl_4 was detected in every groundwater sample collected from this boring between 3 and 148 feet BGS, with the exception of one interval (83 to 88 feet BGS). This pattern of contamination at this location is thought to be the result of mixing due to seasonal variations of groundwater recharge and discharge zones. The distribution of CCl_4 throughout the boring profile may also be the result of a contribution from the potential source suggested by the contaminant profile of LSA 4.

In the LaRue Street residential area (not included on cross section), seven LSA borings were completed (LSA 5, 6, 7, 10, 16, 20, and 24) in order to determine CCl_4 contamination in this area. The contamination detected in LSA 24 was the result of equipment cross-contamination, and is unusable. LSA boring 20 is located upgradient in the Conrail railyard, based on groundwater flow direction, to determine sources of CCl_4 upgradient of the railyard. CCl_4 was detected throughout the profile of this boring at concentrations below the instrument detection limit (5 µg/L). These data show that no CCl_4 source exists directly upgradient of the railyard.

LSA 16 was located on the Conrail railyard adjacent to a reported disposal area. CCl_4 was not detected in the groundwater profile to the completion depth of the boring (68 feet BGS). This information suggests that CCl_4 is not contributing to groundwater contamination from the disposal area.

LSA 10, located downgradient of the Conrail railyard and directly upgradient of the Alco Tool Company along U.S. 33, had a CCl_4 concentration of 48 µg/L in the

groundwater at the 13- to 18-foot sample interval. The remainder of the boring, to a depth of 88 feet, had very low or nondetectable concentrations of CCl_4. LSA 5, located west and north of LSA 10 had a maximum concentration (20 µg/L) in this boring from a single sample interval (53 to 58 feet BGS). This shows a CCl_4 source in the vicinity of LSA 10. LSA 6, located downgradient of LSA 5, had very low CCl_4 concentrations (maximum of 7 µg/L at 23 to 28 feet BGS), indicating little or no migration of contaminants to this specific location.

4.1.2 TCE Results

Figure 4-3 presents the section lines for cross sections C-C', D-D', and E-E'. Plate 3 presents the cross sections showing the concentration contours of TCE within the aquifer in the direction of groundwater flow.

In cross section C-C', LSA 21 was upgradient of the classification yard on the railyard based on groundwater flow direction. It was located to investigate potential sources upgradient of the railyard contributing TCE to the previously identified groundwater contamination. TCE was not detected in the groundwater samples of this boring to the final depth of 140 feet. These data show that no upgradient TCE sources are contributing to TCE contamination identified downgradient of this location.

LSA 27 (not included on the cross section) was located between the southern boundary of the Conrail property and the western drainage pond. The purpose of this boring was to investigate potential sources, upgradient of the Conrail railyard and upgradient of the ponds along the southern boundary of the property. TCE was detected above the detection limit (5 µg/L) at a relatively low concentration (29 µg/L) at a single depth interval (38 to 43 feet BGS). This boring was extended to a depth of 83 feet. These data show that no contributing TCE source existed upgradient to the railyard.

LSA 17 was located directly downgradient of LSA 21, in the track 69 area in the eastern end of the classification yard. This boring was extended to a depth of 108 feet and the highest TCE contamination (75 µg/L) was detected in the groundwater sample from the 8- to 13-foot sample interval. The TCE concentrations in the groundwater samples from 13 feet to 103 feet BGS were detected close to the detection limit or not detected at all. These data show slight TCE contamination in the shallow zone at this boring location.

The highest concentrations of TCE detected in the study area were on the Conrail railyard and is represented by TCE concentrations detected in groundwater samples collected from LSA borings 29, 25, and 26. TCE concentrations in LSA 29 were elevated (1,700 µg/L) in the first sample interval (8 to 13 feet BGS) collected and remained elevated (1,500 µg/L) to the end of the boring at 83 feet BGS. The groundwater sample from the 38- to 43-foot interval detected TCE at 7,500 µg/L, the maximum concentration detected in any sample interval. LSA 25 was advanced to the top of bedrock and TCE was detected throughout the entire profile at elevated concentrations. The concentration of TCE detected in the groundwater sample collected on top of bedrock was 490 µg/L. The maximum concentrations of TCE (>5,000 µg/L) were detected in groundwater samples collected between 43 and 58 feet BGS of this boring. TCE again was detected at elevated concentrations in the groundwater at LSA 26 through the entire length of the boring (93 feet BGS). The maximum concentrations of TCE (>6,000 µg/L) in LSA 26 were detected in groundwater samples collected between 38 and 53 feet BGS. TCE concentrations remained high (>1,800 µg/L) from 53 feet BGS to the end of the boring. The data from these 3 LSA borings show that a significant TCE plume originates on the Conrail railyard from a presently unidentified source location. An elliptically shaped center of TCE contaminant mass with concentrations >5,000 µg/L is identified to span at least between these 3 LSA borings on the Conrail railyard.

LSA 15 tracked the TCE contamination plume from the center of mass described above to the location of LSA 15, north of the car shop. The maximum TCE concentration in this boring (1,000 µg/L) was detected in the groundwater sample interval 43 to 48 feet BGS. Because TCE concentrations detected in LSA 15 were >1,000 µg/L and lower than the TCE concentrations in LSA borings 25 and 26 indicates that LSA 15 is located sidegradient of the identified center of mass.

Immediately downgradient of the Conrail railyard, groundwater samples from LSA 8 (located on the south side of U.S. 33 and within the path of the plume) showed elevated TCE concentrations, ranging from 1,600 µg/L to 3,100 µg/L between 63 and 83 feet BGS. TCE contamination was detected throughout the profile between 23 and 136 feet BGS. Low TCE concentrations (<15 µg/L) are detected from the water table to an approximate depth of 50 feet. LSA 2, located north of LSA 8, detected a similar contamination profile pattern as that of LSA 8. The TCE concentration profile in the shallow zone is thought to

be the result of the downward vertical gradients in the area. The high concentration zones detected in these two borings identify part of another elliptical center of TCE contaminant mass, also trending downward under the influence of a downward vertical hydraulic gradient. This center of mass is identified by concentrations > 1,000 µg/L.

Further downgradient of LSA 2 and 8, TCE was detected at every groundwater sample interval of LSA 14, to the completion depth of the boring (148 feet BGS). In this boring, concentrations of 78 µg/L and 79 µg/L detected at shallow depths (13- to 18-foot and 23- to 28-foot intervals, respectively) were significantly higher than concentrations detected in LSA 2 and 8 at similar depths. These data suggest an additional potential shallow source contributing TCE contamination. Between 33 and 108 feet BGS of this boring, the concentrations are > 500 µg/L, with two intervals (33 to 58 feet BGS and 93 to 98 feet BGS) detecting TCE at concentrations > 1,000 µg/L. The high concentrations detected between 33 and 58 feet BGS identify another elliptical center of TCE contaminant mass with concentrations > 1,000 µg/L. This center of mass may be the result of contribution from the potential source indicated by shallow TCE contamination detected in this boring. The high contamination detected between 93 and 98 feet identifies the tail end of the center of mass identified in LSA 2 and 8. Both center of masses are trending downward, a result of the downward vertical gradient in the area. This contamination tracks the TCE groundwater plume from the Conrail railyard into the County Road 1 residential area.

LSA 1 was located in the County Road 1 residential area, adjacent to MW02 monitoring well location, within the path of the groundwater plume, based on groundwater flow direction and Phase I groundwater analytical results from MW02S and MW02D. TCE was detected throughout the profile of this boring to a depth of 148 feet. High concentrations (> 1,000 µg/L) were detected between 73 and 118 feet BGS. This center of mass was surrounded by concentrations > 500 µg/L at 68 feet BGS and 138 feet BGS. The zone of high concentration (> 1,000 µg/L) is a continuation of the shallow center of mass indicated in LSA 14. The surrounding contamination (> 500 µg/L) is a continuation of the contaminant plume originating on the Conrail railyard. The downward trend of the TCE plume is a result of the downward vertical gradient.

Further downgradient in the direction of groundwater flow, LSA 3 was located between the County Road 1 and Vistula Avenue residential areas in order to investigate

the potential link between the TCE contamination source(s) on the Conrail railyard and the TCE contamination previously identified in the Vistula Avenue area. In this boring, TCE was detected in every sample collected throughout the profile to a completion depth of 143 feet. Elevated concentrations of TCE were detected (480 µg/L) at a shallower depth (38 feet) than were identified (20 µg/L) at a similar depth in LSA 1. This data coupled with the known downward vertical gradient in the area suggest contribution from a potential shallow TCE source. TCE concentrations >500 µg/L were detected between depths 58 to 83 feet, and again between depths 128 to 133 feet. The concentration between these zones range from 220 µg/L to 400 µg/L. The shallow zone (58 to 83 feet BGS) of elevated TCE concentrations (>500 µg/L) may indicate a continuation of the TCE plume originating on the Conrail railyard or may indicate the center of mass of the potential shallow source suggested based on shallower TCE concentrations detected in this boring. The deeper zone (128 to 133 feet BGS) of elevated TCE concentration (>500 µg/L) shows a continuation of the TCE plume originating on the Conrail railyard.

LSA 4 was located in the path of groundwater contamination upgradient of Vistula Avenue contamination area, in order to further establish the link between contamination in Vistula Avenue and County Road 1 areas. The groundwater sample collected from the 18- to 23-foot interval in this boring detected TCE at a concentration of 130 µg/L. The concentration of TCE quickly decreases with depth and was non-detectable at a depth of 48 feet. TCE concentrations remained undetectable until 118 feet BGS where TCE was detected at 35 µg/L. The highest concentration of TCE (50 µg/L) in the deep portion of this boring was in the groundwater sample from the 128 to 133 foot interval. This contamination tracks the plume from County Road 1 area to the Vistula Avenue area. The TCE detected near the water table in this boring is at a higher concentration (130 µg/L) than found at a similar depth in LSA 3 (20 µg/L). The known downward vertical gradient in the area coupled with the undetected TCE zone between 48 and 113 feet BGS in LSA 4 indicate contribution from a potential shallow TCE source.

LSA 9 was located within the path of the groundwater plume and along the St. Joseph River to determine if the plume reached the river. TCE was detected in every groundwater sample collected between 3 and 148 feet BGS. This pattern of contamination at this location is thought to be the result of mixing due to seasonal variations of the groundwater recharge and discharge zones. The distribution of TCE throughout the boring

profile may also be the result of contribution from the potential shallow source indicated by the contaminant profile of LSA 4.

In cross section D-D', the contaminant profile and implications of LSA 3 have been presented and discussed. LSA 13 was located upgradient of the Charles Avenue area in order to investigate the link between groundwater contamination in Charles Avenue and County Road 1 areas. The groundwater flow in this area takes on a stronger westerly component, toward Baugo Bay. In LSA 13, completed to a depth of 138 feet, TCE was first detected at concentrations >50 µg/L at a depth of 93 feet. Above this depth, very low or non-detectable levels of TCE were detected. The highest concentration of TCE (250 µg/L) was detected in groundwater from the interval 113 to 118 feet BGS. The contamination gradually decreases from this depth to the end of the boring, where TCE is detected at 33 µg/L. The decrease in depth of detectable levels of TCE in this boring is the result of the downward vertical gradient in the area. The higher TCE concentrations toward the end of the boring shows the continuation of the TCE plume originating on the Conrail railyard. LSA 12, located close to Baugo Bay, revealed low TCE concentrations (29 µg/L) detected near the water table. TCE concentrations quickly decrease to non-detectable levels by 43 feet BGS, and was detected again at 123 feet BGS at a concentration of 320 µg/L. The concentrations remain at this approximate concentration to the completion depth of this boring (148 feet BGS). Because Charles Avenue area is within the path of the groundwater contamination plume originating on the Conrail railyard, the deep TCE contamination detected in LSA 12 may show continuation of this same plume.

In cross section E-E', LSA 20 was located upgradient in the Conrail railyard in order to investigate potential, upgradient sources contributing to TCE groundwater contamination detected in the La Rue Street area. TCE was detected (16 µg/L) above the instrument detection limit at a single interval (38 to 43 feet BGS) through the completion depth of the boring (73 feet BGS). These data show a contributing source in the vicinity of LSA 20.

Downgradient of this location, LSA borings 16 and 17 were located on the Conrail railyard. The highest level of contamination detected in LSA 16 (53 µg/L) was in the groundwater sample from the 18- to 23-foot interval. Contaminant levels gradually decrease until 33 feet BGS where TCE is detected below the instrument detection limit. 16 µg/L of TCE is detected at the completion depth of this boring (68 feet). LSA 7 detected TCE contamination ranging from 6 µg/L to 160 µg/L between 23 and 43 feet

BGS. TCE was not detected from 43 feet to the end of the boring at 68 feet BGS. The data from the shallow zones of these two borings show the origination of a TCE plume on the Conrail railyard in the vicinity of LSA 7. A center of TCE contaminant mass is identified in LSA 7 between 28 and 33 feet BGS. The low level of contamination detected in LSA 16 shows a continuation of the low levels of TCE contamination identified in LSA 20. The downward trend of this deeper contamination is the result of the downward vertical gradient in the area.

Further downgradient, LSA 6 is located in the LaRue Street residential area. Low or nondetectable levels of TCE contamination are detected in this boring to its completion depth (98 feet). The maximum concentration (15 µg/L) was detected near the water table. These data show the continuation of the TCE groundwater plume from the Conrail railyard into the LaRue Street residential area.

4.2 SOIL BORINGS - SUBSURFACE SOILS

The analytical results for 42 soil samples and duplicate subsurface soil samples are presented in Appendix C. The types of analyses performed for each sample are listed in Table 2-1 and a summary of the analytical results is presented in Table 4-1. Volatile and semivolatile analyses were performed for all 42 soil samples to preliminarily define the dimensions and nature of the sources. Four samples were analyzed for pesticides/PCBs, TAL metals, and TOC. The locations for these four samples were chosen to provide samples representative of the study area and to provide data potentially necessary for the FS. These data are reported but not discussed in this report. Soil boring locations were selected based upon LSA results. Soil sample intervals selected for volatile and semi-volatile CLP analyses were chosen based on OVA readings in the field and/or based on the depth and aquifer material relative to the LSA results.

CCl_4 - Carbon tetrachloride was detected in seven soil samples with the highest concentration measured at 27,000 µg/kg in B-24, at the 20- to 22-foot sample interval. CCl_4 was also detected in sample B-25, in the 23.5- to 25.5-foot sample interval at 23,000 µg/kg.

TCE - Trichloroethene was detected in 16 samples. The highest concentration was 15,000 µg/kg in B-28, at the 0- to 2-foot sample interval. This compound was also detected in sample B-32, at the 0- to 2-foot sample interval at 170 µg/kg.

Other Volatiles - Ten volatile organic compounds (VOCs), other than CCl_4 and TCE, were detected in the soil samples. Chloroform was detected in three samples, the highest concentration (3,300 µg/kg) from B-24, at 22.5- to 24.5-foot sample interval. 1,2-dichloroethene (total) was detected in four samples. Sample B-32, 0- to 2-foot interval, revealed the highest concentration, at 5,600 µg/kg. Toluene, the most frequently detected VOC, was detected in 21 samples. Sample B-35, at 0 to 2 feet, had the highest concentration of toluene (38 µg/kg). Acetone was detected in 15 samples with sample B-25, 23.5 to 25.5 feet, having the highest concentration (4,700 µg/kg). Acetone is considered a common laboratory artifact.

Semivolatiles - Twenty semivolatile compounds were detected with pyrene as the most frequently detected in eight samples. Sample B-20, 5 to 6.5 feet, had the highest concentration of pyrene, detected at 6,800 µg/kg.

Discussion - Five areas on the Conrail railyard were targeted in the subsurface soil investigation to locate and define sources of the CCl_4 and TCE groundwater contamination: the car shop, the clean-out track, the pond area, track 69 in the east end of the classification yard, and between tracks 65 and 66 in the west end of the classification yard. Soil boring locations in these five areas are presented on Plate 1. Two of the areas, respectively, revealed high concentrations of CCl_4 and TCE in the soil; respectively, each area is identified as a source for CCl_4 or TCE groundwater contamination.

A CCl_4 source located in the track 69 area, in the eastern end of the classification yard, is identified based on analytical results of soil samples collected from soil borings B-24 and B-25. Plate 1 presents CCl_4, TCE, and other selected organic analytical results for all soil samples analyzed. The deepest CCl_4 contamination detected in this area occurs at a depth of 25.5 feet BGS in soil boring B-25, at a concentration of 23,000 µg/L. Similar levels and depths of contamination were detected in B-24. The vertical extent of this source is not yet determined. Soil samples from similar depths analyzed from B-26,

located 40 feet east of B-25, revealed CCl_4 at 2 µg/L or not detected. These data suggest that large changes in CCl_4 concentrations in the soil occur over relatively small, lateral distances. The areal extent of this source is not yet determined.

A TCE source area is located in the west end of the classification yard between tracks 65 and 66, and is identified based on analytical results of soil samples collected from borings B-28 and B-32. A contamination pattern exists similar to that observed in the track 69 area, that is, a sharp difference in contaminant concentration between samples separated by a small lateral distance. For instance, the 0- to 2-foot depth interval soil sample from B-29 revealed TCE at 13 µg/L, while the soil sample from the same interval from B-28, located 40 feet east of B-29, had a TCE concentration of 15,000 µg/L. The east-west spatial boundaries of this source appear to be well determined, and based on analytical results and sample intervals, this appears to be a surface source of TCE.

4.3 MONITORING WELLS - GROUNDWATER

The analytical results for the 63 groundwater samples from monitoring wells, the duplicates, the blanks, and the trip blanks are listed in Appendix E. The types of analyses obtained for each well are listed in Table 2-6 and a summary of analytical results is presented in Table 4-2. VOC analyses were obtained for all groundwater samples in order to further define the nature and extent of contamination plumes. Plate 4 shows volatile organic analytical results adjacent to the appropriate well locations. Analyses for semi-volatiles, TAL metals, and Special Analytical Services (SAS) parameters were conducted to evaluate the effect of groundwater chemical and physical parameters on potential treatment alternatives. The six sample locations were chosen for these analyses on the basis of their representative distribution throughout the study area. These data are reported but not discussed in this report.

CCl_4 - Carbon tetrachloride was detected in 16 of the groundwater samples. The highest measured concentration was 1,900 µg/L in MW38D.

TCE - Trichloroethene was detected in 25 of the groundwater samples. The highest measured concentration was 11,000 µg/L in MW41.

Other Volatiles - Nine VOCs other than CCl_4 and TCE were detected in the groundwater samples. Chloroform, likely a degradation product of CCl_4, was detected in 13 samples, with the highest concentration (120 µg/L) in MW38D. 1,2-dichloroethene (total), a likely degradation product of TCE, was detected in six samples with the highest concentration of 230 µg/L in MW41.

Discussion - Groundwater data from the Phase II sampling effort confirm that sources contributing CCl_4 and TCE to the groundwater contamination plume are present on the Conrail railyard. Based upon the groundwater flow in the aquifer, groundwater samples upgradient of the railyard show no detectable levels of CCl_4 and TCE. Groundwater samples from monitoring wells within the railyard have both CCl_4 and TCE; 260 µg/L is the maximum CCl_4 concentration at location MW24, and 6,900 µg/L is the maximum TCE concentration at location MW30I. The CCl_4 and TCE groundwater contamination is effectively tracked directly off the Conrail railyard in a groundwater plume which follows the established groundwater flow direction to the St. Joseph River. The maximum concentrations of CCl_4 and TCE detected directly downgradient of the Conrail railyard, prior to any other potential source(s), are 200 µg/L at location MW42I and 11,000 µg/L at location MW41D, respectively. The data also corroborates conclusions presented in the "Preliminary Evaluation of Phase I Results and Interim Remedial Alternatives" report of a "hot zone" of TCE groundwater contamination in the northern section of the plume as it flows through the County Road 1 residential area and a "hot zone" of CCl_4 groundwater contamination in the southern section of the plume through the same area.

The TCE detected across the study area may have been introduced to the groundwater from the TCE surface source described in Section 4.2. Desorption of TCE through infiltration of rainwater could result in contaminants reaching the water table.

TCE was detected at monitoring well location MW43BR in the Charles Avenue residential area. File information from previous well data (Peerless-Midwest [no date]) has shown that groundwater in this area has detected levels of CCl_4 and TCE. Because Charles Avenue area is within the path of the groundwater contamination plume originating on the Conrail railyard, the TCE detected at MW43BR may show the continuation of this same plume.

The groundwater contaminated with CCl_4 identified through LSA borings in the track 69 area is not effectively tracked with groundwater sample results from this location to the established plume. The CCl_4 source in the track 69 area is confirmed through soil samples from soil borings in this area and discussed in Section 4.2. CCl_4 concentrations detected in groundwater samples from wells on the Conrail railyard may be attributable to an additional, as yet unidentified source on the railyard.

The analytical data and distribution of CCl_4 and TCE in the study area strongly suggest contributions from more than a single source for both compounds. Many other factors may be influencing the distribution of contamination in the study area. For instance, a subsurface drainage network on the railyard containing contaminated storm-water runoff would likely impact the distribution of contamination in the study area.

Table 4-3 is a comparison of CCl_4 and TCE analytical results from groundwater samples collected from LSA borings and monitoring wells. It is important to note that the two sets of data represent different sample collection procedures, analytical methods, and data quality objectives. Although the depth intervals of the LSA samples and the screened intervals of the monitoring wells do not precisely coincide, a comparison of the data sets shows that the LSA technique was effective in determining both upgradient and down-gradient monitoring well locations as well as identifying the screened intervals, the use for which it was intended. At LSA 30 and comparable monitoring well location MW33S, CCl_4 and TCE were detected in the LSA but not in the monitoring well; the majority of comparisons, however, shows a strong similarity of analytical results between the data sets. This added validation of the LSA boring results further substantiates the results presented and discussed in Section 4.1.

Table 4-1

SUMMARY OF CONCENTRATIONS OF ORGANICS AND METALS DETECTED IN SUBSURFACE SOIL SAMPLES

Contaminant	Minimum Concentration	Maximum Concentration	Location of Maximum Concentration	Frequency of Detection[a]
Volatiles (µg/kg)				
Vinyl chloride	8	8	CRB-32 (0-2)	1/42
Methylene chloride	2	11	CRB-20 (7.5-9.5)	8/42
Acetone	18	4,700	CRB-25 (23.5-25.5)	15/42
1,2-dichloroethene (total)	7	5,600	CRB-32 (0-2)	4/42
Chloroform	1,200	3,300	CRB-24 (22.5-24.5)	3/42
2-butanone (MEK)	6	22	CRB-32 (0-2)	7/42
Carbon tetrachloride	2	27,000	CRB-24 (20-22)	7/42
4-methyl-2-pentanone	7	7	CRB-23 (10-12)	1/42
Trichloroethene	1	15,000	CRB-28 (0-2)	16/42
Tetrachloroethene	1	7	CRB-35 (0-2)	11/42
Toluene	1	38	CRB-35 (0-2)	21/42
Xylenes (total)	2	3	CRB-28 (0-2)	5/42
Semivolatiles (µg/kg)				
Hexachloroethane	55	55	CRB-24 (20-22)	1/42
Naphthalene	200	1,800	CRB-20 (5-6.5)	2/42
2-methylnaphthalene	3,900	15,000	CRB-20 (5-6.5)	2/42
Acenaphthylene	61	61	CRB-32 (0-2)	1/42
Acenapthene	61	3,000	CRB-20 (5-6.5)	3/42
Dibenzofuran	420	1,600	CRB-20 (5-6.5)	2/42
Fluorene	63	3,000	CRB-20 (5-6.5)	3/42
Phenanthrene	83	3,800	CRB-20 (5-6.5)	5/42
Anthracene	340	1,400	CRB-20 (5-6.5)	2/42
Di-n-butylphthalate	22	23	CRB-22 (10-12)	2/42
Fluoranthene	38	6,600	CRB-20 (5-6.5)	7/42

Table 4-1

SUMMARY OF CONCENTRATIONS OF ORGANICS AND METALS DETECTED IN SUBSURFACE SOIL SAMPLES

Contaminant	Minimum *Concentration*	Maximum *Concentration*	Location of Maximum Concentration	Frequency of *Detection*[a]
Semivolatiles (µg/kg) (Cont.)				
Pyrene	30	6,800	CRB-20 (5-6.5)	8/42
Benzo[a]anthracene	130	1,200	CRB-20 (5-6.5)	4/42
Chrysene	47	1,500	CRB-20 (5-6.5)	5/42
Bis(2-ethylhexyl)phthalate	49	2,400	CRB-20 (5-6.5)	7/42
Benzo[b]fluoranthene	41	480	CRB-32 (0-2)	5/42
Benzo[k]fluoranthene	140	410	CRB-32 (0-2)	2/42
Benzo[a]pyrene	61	330	CRB-32 (0-2)	3/42
Indeno[1,2,3-cd]pyrene	390	390	CRB-32 (0-2)	1/42
Benzo[g,h,i]perylene	260	260	CRB-32 (0-2)	1/42
Pesticides/PCBs (µg/kg)				
Dieldrin	0.68	0.68	CRB-22 (7.5-9.5)	1/4
Endrin	7.8	7.8	CRB-22 (7.5-9.5)	1/4
Endosulfan sulfate	1.5	1.5	CRB-22 (7.5-9.5)	1/4
Methoxychlor (Mariate)	4.9	4.9	CRB-22 (7.5-9.5)	1/4
Endrin aldehyde	3.1	3.1	CRB-22 (7.5-9.5)	1/4
Aroclor 1260	65	65	CRB-22 (7.5-9.5)	1/4
Total Metals (mg/kg)				
Aluminum	1,970	5,560	CRB-22 (7.5-10.5)	4/4
Arsenic	1.8	4.1	CRB-26 (22.5-24.5)	4/4
Barium	5.8	35.8	CRB-22 (7.5-10.5)	4/4
Cadmium	1.2	3.2	CRB-22 (7.5-10.5)	4/4
Calcium	1,470	98,200	CRB-26 (22.5-24.5)	4/4
Chromium	6.3	18.7	CRB-22 (7.5-10.5)	4/4
Cobalt	2	5.1	CRB-22 (7.5-10.5)	4/4

Table 4-1

SUMMARY OF CONCENTRATIONS OF ORGANICS AND METALS
DETECTED IN SUBSURFACE SOIL SAMPLES

Contaminant	Minimum Concentration	Maximum Concentration	Location of Maximum Concentration	Frequency of Detection[a]
Total Metals (mg/kg) (Cont.)				
Copper	4.6	11.9	CRB-22 (7.5-10.5)	4/4
Iron	4,910	12,300	CRB-22 (7.5-10.5)	4/4
Lead	2.3	6.9	CRB-22 (7.5-10.5)	4/4
Magnesium	1,950	20,800	CRB-26 (22.5-24.5)	4/4
Manganese	159	702	CRB-22 (7.5-10.5)	4/4
Nickel	4.4	15.8	CRB-22 (7.5-10.5)	4/4
Potassium	287	1,020	CRB-22 (7.5-10.5)	4/4
Sodium	120	179	CRB-22 (7.5-10.5)	4/4
Thallium	0.27	0.32	CRB-28 (15-17)	2/4
Vanadium	3.5	14.2	CRB-22 (7.5-10.5)	4/4
Zinc	19.2	34.3	CRB-22 (7.5-10.5)	4/4

[a] Total number of samples consists of investigative samples only. Duplicate samples not included.

Note: This table reports only organics and metals of concern that were detected in the analysis. Non-detected organics and metals are not reported.

Table 4-2

SUMMARY OF CONCENTRATIONS OF ORGANICS AND METALS DETECTED IN GROUNDWATER SAMPLES

Contaminant	Minimum Concentration	Maximum Concentration	Location of Maximum Concentration	Frequency of Detection[a]
Volatiles (µg/L)				
Acetone	2	26	MW44D-1	14/63
Carbon disulfide	2	3	MW03-2	2/63
1,1-dichloroethene	56	56	MW41-1	1/63
1,1-dichloroethane	3	3	MW30BR-1	1/63
1,2-dichloroethene (total)	2	230	MW41-1	6/63
Chloroform	2	120	MW38D-1	13/63
1,1,1-trichloroethane	4	14	MW21D-2	4/63
Carbon tetrachloride	2	1,900	MW38D-1	16/63
Trichloroethene	2	11,000	MW41-1	25/63
1,1,2-trichloroethane	2	2	MW41-1	1/63
Tetrachloroethene	6	7	MW34-1	3/63
Semivolatiles (µg/L)				
Di-n-butylphthalate	0.6	0.6	MW39-1	1/6
Bis(2-ethylhexyl)phthalate	21	21	MW42-1	1/6
Di-n-octylphthalate	2	2	MW30S-1	1/6
Total Metals (µg/L)				
Arsenic	4.1	4.6	MW41-1	3/6
Barium	28.6	68.1	MW39-1	4/6
Cadmium	15.1	15.1	MW41-1	1/6
Calcium	60,200	124,000	MW39-1	6/6
Cobalt	49.2	49.2	MW41-1	1/6
Copper	10.5	101	MW41-1	3/6
Iron	87.8	217	MW42-1	2/6
Lead	2.2	5.7	MW41-1	3/6

Table 4-2

SUMMARY OF CONCENTRATIONS OF ORGANICS AND METALS DETECTED IN GROUNDWATER SAMPLES

Contaminant	Minimum Concentration	Maximum Concentration	Location of Maximum Concentration	Frequency of Detection[a]
Total Metals (ug/L) (Cont.)				
Magnesium	10,400	23,200	MW39-1	6/6
Manganese	10.8	717	MW27S-1	5/6
Nickel	44.7	69.9	MW41-1	2/6
Potassium	1,410	14,000	MW39-1	6/6
Sodium	4,180	206,000	MW2S-2	6/6
Zinc	16.8	427	MW27S-1	5/6
Special Analytical Services (mg/L)				
Biochemical Oxygen Demand	13	19	MW30I-1 MW37D-1	3/3
Chemical Oxygen Demand	21	83	MW30I-1	3/3
Nitrate/Nitrate	1.65	4.05	MW30I-1	3/3
Oil and Grease	8	8	MW02S-2 MW23S-2 MW30I-1	3/3
Total Alkalinity	248	1,155	MW02S-2	3/3
Total Dissolved Solids	350	820	MW02S-2	3/3
Total Organic Carbon	3.5	17.8	MW02S-2	3/3
Total Suspended Solids	464	8,740	MW02S-2	3/3

[a] Total number of samples consists of investigative samples only. Duplicate samples not included.

Note: This table reports only organics and metals of concern that were detected in the analysis. Non-detected organics and metals are not reported.

Table 4-3

COMPARISON OF GROUNDWATER ANALYTICAL RESULTS FOR CARBON TETRACHLORIDE AND TRICHLOROETHENE FROM LSA BORINGS AND MONITORING WELLS

LSA		Monitoring Well		CCl_4 (µg/L)		TCE (µg/L)	
LSA No.	Sample Interval (feet)	Well No.	Screened Interval (feet)	LSA	CLP	LSA	CLP
LSA1	23-28	MW02S	6.5-26.5	27	130	11	95
LSA1	73-78	MW02D	70-80	210	51	1400E	270
LSA1	143-148	MW02BR	158.9-168.9	3	ND	230	32
LSA3	18-23	MW37S	12-22	22	15	20	20
LSA3	88-103	MW37D	90-100	130	110	340	540
LSA4	18-23	MW38S	11-21	420	720	130	87
LSA4	88-103	MW38D	90-100	1600E	1900	ND	17
LSA6	13-18	MW20S	11-31	4J	ND	15	8
LSA6	73-78	MW20D	71-81	3J	ND	ND	ND
LSA7	23-28	MW39S	20-30	1J	ND	67	ND
LSA8	68-73	MW41D	65-75	1J	ND	3100	11000
LSA9	13-18	MW08S	14.5-34.5	64	800	80	160
LSA9	73-75	MW08D	71-81	16	310	65	200
LSA9	123-128	MW08BR	126-136	ND	4	10	ND
LSA10	23-28	MW40S	20-30	5	65	15	2
LSA11	43-48	MW42I	40.1-50.1	330	200	76	22
LSA12	13-18	MW43S	6-16	4J	ND	29	ND
LSA12	143-148	MW43BR	146.5-156.5	ND	ND	420	330
LSA13	113-128	MW44D	115-125	690E	970	205	28
LSA15	43-48	MW34I	40-50	2J	ND	1000E	1400
LSA21	8-13	MW31S	8.5-18.5	ND	ND	ND	ND
LSA21	48-53	MW31I	42-52	ND	ND	ND	ND

Table 4-3

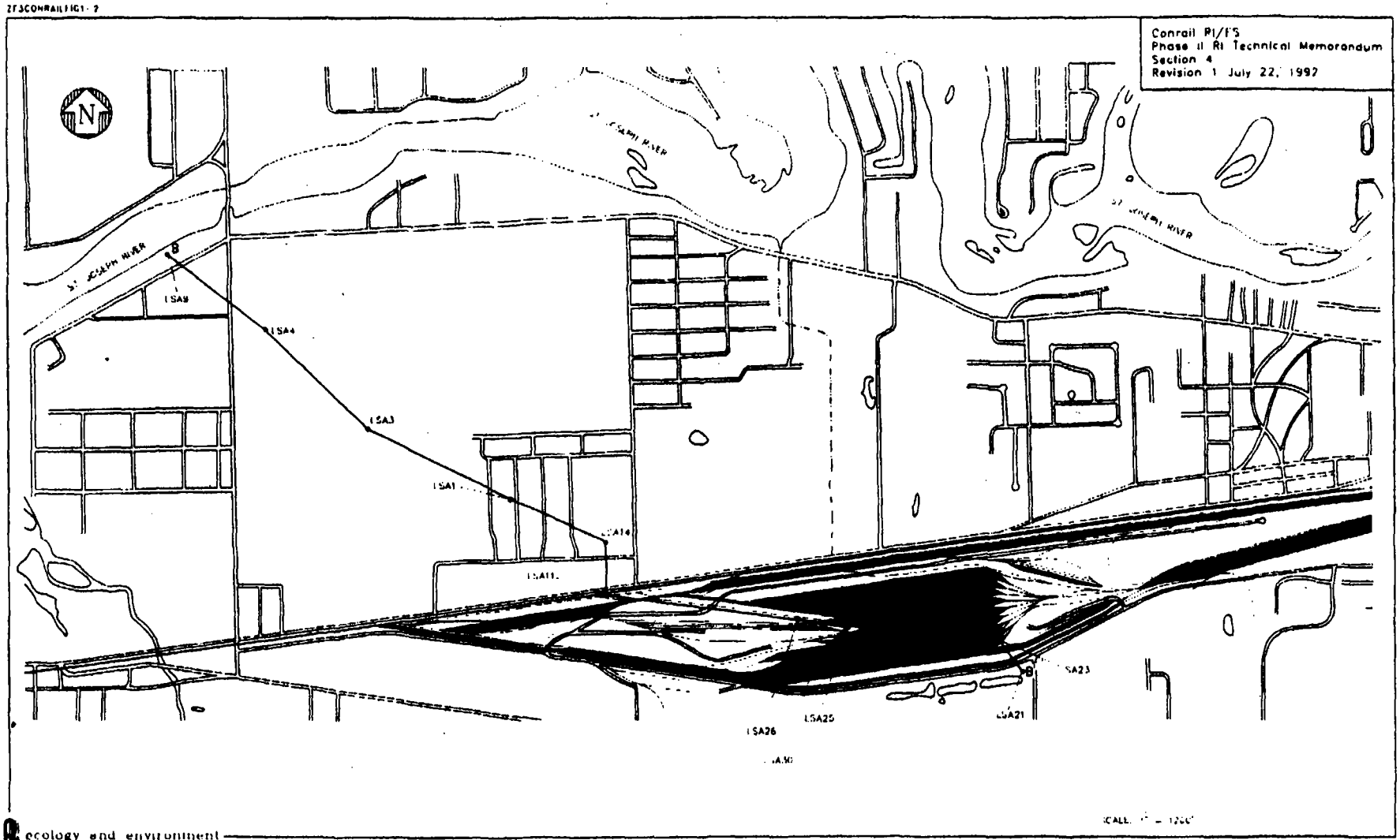
COMPARISON OF GROUNDWATER ANALYTICAL RESULTS FOR CARBON TETRACHLORIDE AND TRICHLOROETHENE FROM LSA BORINGS AND MONITORING WELLS

LSA		Monitoring Well		CCl_4 (µg/L)		TCE (µg/L)	
LSA No.	Sample Interval (feet)	Well No.	Screened Interval (feet)	LSA	CLP	LSA	CLP
LSA24	23-28	MW35S	20-30	17	ND	ND	ND
LSA25	13-18	MW30S	8-18	8	ND	890E	130
LSA25	43-48	MW30I	42.7-52.7	4J	ND	5200E	6900
LSA25	93-98	MW30D	94.7-104.7	6	ND	1200E	38
LSA25	143-148	MW30BR	137-147	6	ND	490	ND
LSA27	8-13	MW27S	8-18	ND	ND	4J	ND
LSA27	48-53	MW27I	43.1-53.1	ND	ND	ND	ND
LSA28	18-23	MW32S	18-28	ND	ND	9	2
LSA28	38-43	MW32I	40-50	ND	ND	3J	160
LSA30	21-26	MW33S	16.5-26.5	3100E	ND	1200E	ND

Definitions of field lab qualifiers (CLP qualifiers not shown):

E Estimated above the upper limit of the calibration range (500 µg/L).
J Measured below the detection limit (5 µg/L).

ZF3CONRAIL FIG1-2



ecology and environment

FIGURE 4-1 SECTION LOCATION - B-B' MAP

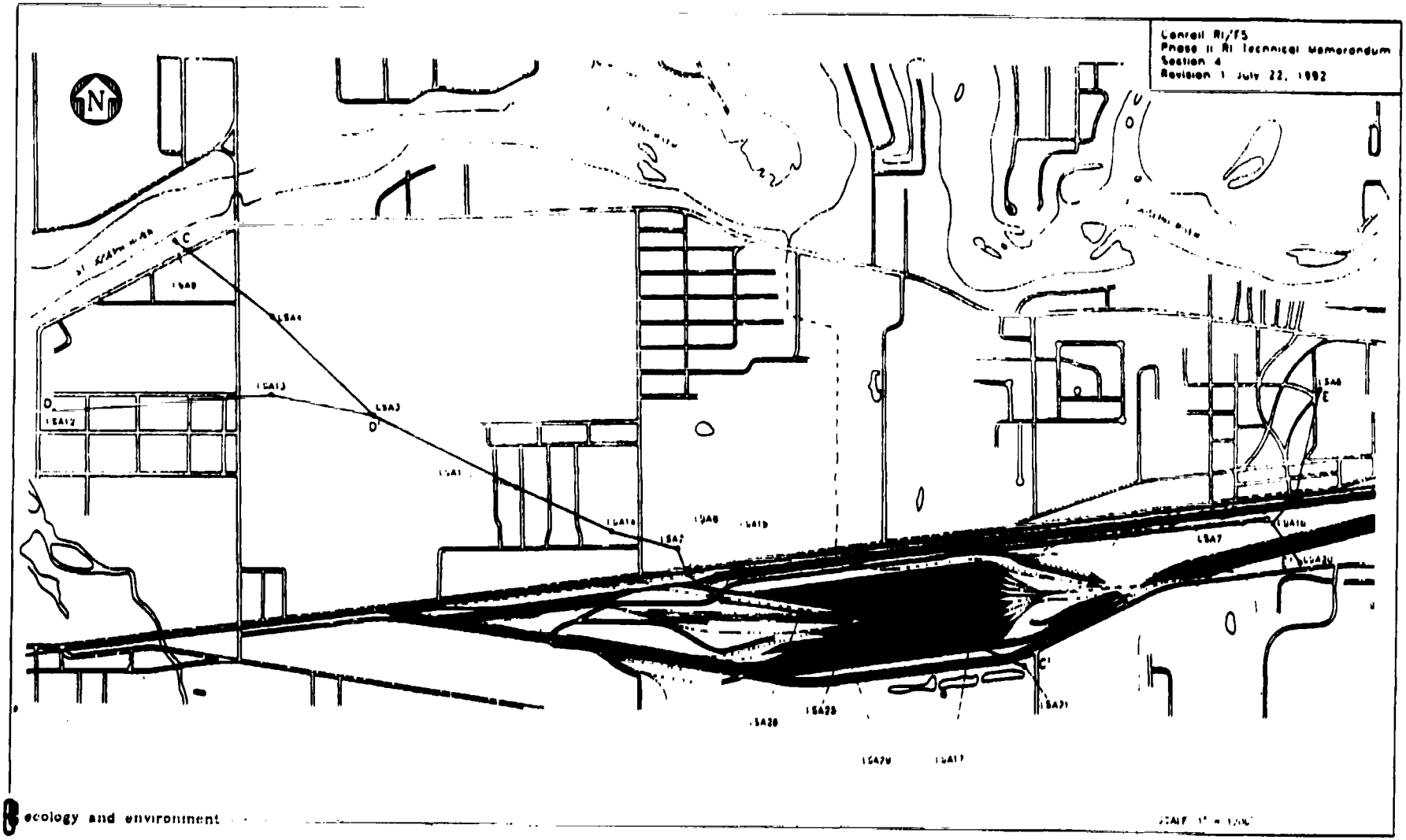


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FIGURE 4-2 SECTION LOCATIONS - C-C'; D-D'; AND E-E' MAP

5. CONCLUSIONS AND DATA GAPS

The purpose of the Phase II RI was to determine the nature and extent of contamination at the Conrail railyard and vicinity and to address the following objectives presented in the WP.

- Preliminarily identify the potential source(s) contributing to the County Road 1 and LaRue Street contamination areas;
- Evaluate the relationship between the County Road 1 plume, the Vistula Avenue plume, and the Charles Avenue plume;
- Define the nature and approximate extent of the source(s) of the contamination as they are tentatively identified during the Phase II investigation; and
- Further define the nature and extent of the contaminant plumes.

5.1 CONCLUSIONS

This Phase II RI Technical Memorandum addresses the objectives listed above and documents the following conclusions:

1) Soil analytical results and LSA data confirm a railyard CCl_4 source in track 69 on the east end of the classification yard. Soil analytical results and LSA data also confirm a railyard TCE source between tracks 65 and 66 on the west end of the classification yard. LSA and monitoring well data indicate additional CCl_4 and TCE sources on the Conrail railyard contributing to off-site groundwater contamination. LSA data and groundwater results provide additional information confirming a link between contamination on the Conrail railyard and groundwater contamination in County Road 1.

- The link between County Road 1 contamination and Charles Avenue contamination requires further investigation.

- The potential contributions from Fibertron and/or Elkhart Office Machine (EOM) require investigation. Landfarming of septic sewer waste in the open fields between County Road 1 and Vistula Avenue and landfarming and disposal facilities on Chizum's property both require investigation.

- An Ecological Assessment to address impact of contamination to the St. Joseph River, Baugo Bay, and the ponds on the Conrail railyard.

- A pump test to model contaminant transport and to evaluate alternatives for proper remediation of the site and vicinity.

The need for and scope of potential Phase III RI activities to address these data gaps will be discussed with EPA prior to recommending future work.

6. REFERENCES

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APPENDIX A

LEAD-SCREEN AUGER SAMPLING RESULTS

APPENDIX A

LEAD SCREEN AUGER (LSA) BORING RESULTS

CONRAIL

ELKHART, INDIANA

Data Qualifiers for LSA Results

E	Estimated value. Concentration is above upper end of calibration curve (500 µg/L).
-	Not detected.
J	Estimated value. Present but below detection limit (5 µg/L). All chloroform values are estimated based on a one-point calibration curve.

Abbreviations of Target Compounds

TCA	1,1,1-trichloroethane
CCl_4	carbon tetrachloride
TCE	trichloroethene
CHL	chloroform

Other Abbreviations

NA	Not analyzed for.
DB	Decontamination Blank (decontaminated equipment in parentheses).

LSA1 - Adjacent to MW02

Date	Sample No.	Results (ug/L) TCA	CCl_4	TCE	CHL
7/17/91	CR-LSA1-13-18	-	5.6	2.4	NA
7/17/91	CR-LSA1-23-28	-	27	11	NA
7/17/91	CR-LSA1-33-38	-	110	20	NA
7/17/91	CR-LSA1-43-48	-	78	160	NA
	43-48 Dup	-	73	110	NA
7/17/91	CR-LSA1-53-58	-	86	26	NA
7/17/91	Trip Blank	-	-	-	NA
7/18/91	Field Blank	-	-	-	NA
7/18/91	CR-LSA1-63-68	-	92	450	NA
7/18/91	CR-LSA1-73-78	-	210	1,400E	NA
7/18/91	Field Blank	-	-	-	NA
7/18/91	CR-LSA1-83-88	-	180	1,500E	NA
7/18/91	DB (Rock Pump)	-	35	560E	NA
7/18/91	CR-LSA1-93-98	-	100	1,400E	NA
7/18/91	CR-LSA1-113-118	-	20	1,000E	NA
7/18/91	DB (Bailer)	-	-	4J	NA
7/18/91	CR-LSA1-133-138	-	9	540E	NA
7/18/91	Trip Blank	-	-	1J	NA
7/19/91	CR-LSA1-143-148 No. 1 (Pitcher Pump Sample)	-	6	280	NA
	CR-LSA1-143-148 No. 2	-	3	230	NA
	143-148 No. 2 Dup	-	4	380	NA
	(Rock Pump Sample)				
7/19/91	Rock Pump Decon Blk	-	1	82	NA
7/19/91	Water Drillers are using (Park Water) Collected thru Hose	-	-	-	NA

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LSA2 - Van Diepenbos - Intersection of Tower Road & C.R.1

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
7/20/91	CR-LSA2-6-11	-	-	120	NA
7/20/91	CR-LSA2-13-18	-	-	9	NA
7/20/91	DB (Keck Pump)	-	-	3J	NA
7/20/91	DB (Bailer)	-	-	-	NA
7/20/91	CR-LSA2-23-28 (Collected with Bailer)	-	-	13	NA
7/20/91	CR-LSA2-23-28 (Collected with Keck Pump)	-	-	20	NA
7/20/91	CR-LSA2-33-38-Keck Pump	-	-	23	NA
	33-38-Keck Dup	-	-	14	NA
	33-38-Bailer	-	-	6	NA
	33-38-Pitcher Pump	-	-	7	NA
7/20/91	CR-LSA2-43-48	-	-	33	NA
7/20/91	CR-LSA2-53-48-3 vols-Keck Pump	-	-	12	NA
	53-48-4 vols-Keck Pump	-	2	61	NA
	53-48-5 vols-Keck Pump	-	1	30	NA
7/20/91	CR-LSA2-63-68-Bailer	-	40	110	NA
7/20/91	Van Diepenbos Well - No Filter	-	8	-	NA
7/20/91	CR-LSA2-73-78-Keck Pump*	-	40	2,300E	NA
7/21/91	DB (Keck Pump)	-	-	40	NA
7/21/91	CR-LSA2-83-88	-	-	810	NA
	83-88 Dup	-	-	840	NA
7/21/91	CR-LSA2-93-98	-	-	750	NA
7/21/91	CR-LSA2-103-108	-	-	170	NA
7/21/91	DB (Keck Pump)	-	-	10	NA
7/21/91	CR-LSA2-113-118	-	-	37	NA
7/21/91	CR-LSA2-123-128	-	-	13	NA
7/21/91	CR-LSA2-133-138	-	-	49	NA
7/21/91	Trip Blank	-	-	-	NA

*From here on, all samples taken with Keck Pump unless otherwise noted.

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LSA3 - Sprague's Property

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL*
7/22/91	DB (Rock Pump)	-	-	10	-
7/22/91	CR-LSA3-18-23	-	22	20	-
7/22/91	CR-LSA3-28-33	-	68	140	-
7/22/91	CR-LSA3-38-43	-	330	480	11J
	38-43 Dup	-	250	330	9J
7/22/91	CR-LSA3-48-53	-	500	350	32J
7/22/91	CR-LSA3-58-63	-	470	890	33J
7/22/91	CR-LSA3-68-73	-	260	510	36J
7/22/91	DB (Rock Pump)	-	-	14	-
7/22/91	DB (Rock Hose)	-	-	13	-
7/22/91	CR-LSA3-78-83	-	210	580	20J
7/22/91	CR-LSA3-88-93	-	130	220	6J
7/22/91	CR-LSA3-98-103	-	130	340	7J
7/23/91	CR-LSA3-108-113	-	110	400	7J
	108-113 Dup	-	76	270	5J
7/23/91	CR-LSA3-118-123	-	80	390	20J
7/23/91	CR-LSA3-128-133	-	33	640	7J
7/23/91	DB (Rock Pump)	-	-	26	-
7/23/91	CR-LSA3-138-143	-	9	360	-
7/23/91	Trip Blank	-	-	-	-

* All chloroform concentrations based on a one-point calibration.

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LSA4 - McPhee's - On Ash Road

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
7/24/91	CR-LSA4-18-23	-	420	130	9J
	18-23 Dup	-	400	120	9J
7/24/91	CR-LSA4-28-33	-	12	7	-
7/24/91	CR-LSA4-38-43	-	2J	2J	2J
7/29/91	CR-LSA4-48-53	-	-	-	-
	48-53 Dup	-	-	-	-
7/29/91	CR-LSA4-68-73	-	190	-	29J
7/29/91	DB (Keck Pump)	-	10	-	-
7/29/91	CR-LSA4-78-83	-	960E	-	50J
7/29/91	CR-LSA4-88-93-Keck Pump in Riser	-	1,300E	-	130J
	CR-LSA4-88-93-Keck Pump in Screened Section	-	1,900E	-	280J
7/29/91	CR-LSA4-98-103	-	1,300E	-	180J
7/29/91	CR-LSA4-108-113	-	1,100E	-	130J
7/29/91	Trip Blank	-	-	-	-
7/30/91	CR-LSA4-118-123	-	700	35	130J
	118-123 Dup	-	1,000	67	220J
7/30/91	CR-LSA4-128-133	-	16	50	-
7/30/91	DB (Keck Pump)	10	24	-	-
7/30/91	CR-LSA4-138-143	-	150	-	50J

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LSA5 - Elkhart Surplus Salvage

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
7/31/91	CR-LSA5-13-18	-	5	-	-
	13-18 Dup	-	23	-	-
7/31/91	CR-LSA5-23-28	-	7	-	-
7/31/91	CR-LSA5-33-38	-	-	-	-
7/31/91	CR-LSA5-43-48	-	23	-	-
7/31/91	DB (Rock Pump)	-	-	-	-
7/31/91	CR-LSA5-53-58	-	20	-	-
7/31/91	CR-LSA5-63-68	-	9	-	-
7/31/91	CR-LSA5-73-78	-	-	-	-
7/31/91	Trip Blank	-	-	-	-

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LSA6 - Matthews - Elm Ridge Road - Just North of MW20

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
8/1/91	CR-LSA6-13-18	7	4J	15	-
	13-18 Dup	8	5	15	-
8/1/91	CR-LSA6-23-28	1J	7	5	-
8/1/91	CR-LSA6-33-38	-	1J	-	-
8/1/91	CR-LSA6-53-58	-	4J	2J	-
8/1/91	CR-LSA6-63-68	-	1J	-	-
8/1/91	DB (Keck Pump)	-	2J	-	-
8/1/91	CR-LSA6-73-78	-	3J	-	-
8/1/91	CR-LSA6-83-88	-	-	-	-
8/1/91	CR-LSA6-93-98	-	-	-	-
8/1/91	Trip Blank	-	-	-	-

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LSA7 - Along South Side of U.S. 33 - Directly Across from Redwood Restaurant - LaRue Street Area

Date	Sample No.	Results (ug/L) TCA	CCl_4	TCE	CHL
8/2/91	CR-LSA7-13-18	-	1J	-	-
	13-18 Dup	-	1J	-	-
8/2/91	CR-LSA7-23-28	-	1J	67	-
8/2/91	CR-LSA7-28-33	-	-	160	-
8/2/91	CR-LSA7-33-38	-	-	89	-
8/2/91	CR-LSA7-38-43	-	-	6	-
8/2/91	CR-LSA7-43-48	-	-	-	-
8/2/91	CR-LSA7-48-53	-	-	-	-
8/2/91	CR-LSA7-53-58	-	-	-	-
8/2/91	CR-LSA7-63-68	-	-	-	-
8/2/91	DB (Rock Pump)	-	1J	-	-
8/2/91	Trip Blank	-	-	-	-

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LSA8 - Between MW14 and MW23 Along U.S. 33

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
8/3/91	CR-LSA8-6.5-11.5	-	3J	4J	-
	6.5-11.5 Dup	-	3J	4J	-
8/3/91	CR-LSA8-13-18	-	4J	3J	-
8/3/91	CR-LSA8-23-28	1J	3J	5J	-
8/3/91	CR-LSA8-33-38	-	6	8	-
8/3/91	DB (Keck Pump)	-	1J	-	-
8/3/91	CR-LSA8-43-48	-	9	12	-
8/3/91	CR-LSA8-53-58	-	74	120	11J
8/3/91	CR-LSA8-63-68	-	27	2,600E	14J
8/3/91	CR-LSA8-68-73	-	1J	3,100E	7J
8/3/91	CR-LSA8-73-78	-	-	1,800E	5J
8/3/91	CR-LSA8-78-83	-	1J	1,600E	7J
8/3/91	Trip Blank	-	-	-	-
8/4/91	DB (Keck Pump)	-	-	31	-
8/4/91	CR-LSA8-83-88 No. 1*	-	-	690E	-
	83-88 No. 2*	-	-	360	-
	83-88 No. 3*	-	-	360	-
8/4/91	CR-LSA8-93-98	-	-	110	-
	93-98 Dup	-	-	91	-
8/4/91	CR-LSA8-103-108	-	-	48	-
8/4/91	CR-LSA8-113-118	-	-	10	-
8/4/91	CR-LSA8-123-128	-	-	130	-
8/4/91	CR-LSA8-131-136	-	-	230	-
8/4/91	Trip Blank	-	-	-	-

* No. 1, 2, and 3 refers to collecting sample after purging 1, 2, and 3 volumes, respectively. Purging took place with pump position in riser at top of water table, and sample was collected by submerging pump into screened section.

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LSA9 - E. Murphy's - Close to St. Joe River on Vistula

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
8/5/91	CR-LSA9-3-8	-	7	68	-
	3-8 Dup	-	5	61	-
8/5/91	CR-LSA9-13-18	-	64	80	8J
8/5/91	CR-LSA9-23-28	-	21	12	2J
8/5/91	CR-LSA9-33-38	-	210	55	19J
8/5/91	CR-LSA9-43-48	-	390	190	37J
8/5/91	CR-LSA9-53-58	-	72	46	-
8/5/91	CR-LSA9-63-68	-	130	110	16J
8/5/91	CR-LSA9-73-78	-	16	65	-
8/5/91	CR-LSA9-83-88	-	-	8	-
8/5/91	DB (Rock Pump)	-	3J	-	-
8/5/91	CR-LSA9-93-98	-	1J	92	4J
8/5/91	CR-LSA9-103-108	-	220	35	54J
8/5/91	Trip Blank	-	-	-	-
8/6/91	CR-LSA9-113-118	-	130	110	140J
	113-118 Dup	-	150	150	170J
8/6/91	CR-LSA9-123-128	-	-	10	-
8/6/91	DB (Rock Pump)	-	2J	13	-
8/6/91	CR-LSA9-133-138	-	3J	11	-
8/6/91	CR-LSA9-143-148	-	9	58	-
8/6/91	Trip Blank	-	-	-	-

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LSA10 - Upgradient of Alco Tool, South Side of U.S. 33

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
8/7/91	CR-LSA10-13-18	-	48	32	-
	13-18 Dup	-	40	25	-
8/7/91	CR-LSA10-23-28	7	5	15	-
8/7/91	CR-LSA10-28-33	11	4J	28	-
8/7/91	CR-LSA10-33-38	3J	4J	28	-
8/7/91	CR-LSA10-38-43	32	-	-	-
8/7/91	CR-LSA10-43-48	11	-	17	-
8/7/91	CR-LSA10-48-53	2J	2J	12	-
8/12/91	CR-LSA10-53-58	2J	3J	8	3J
	53-58 Dup	2J	3J	11	1J
8/12/91	CR-LSA10-63-68	-	1J	3J	-
8/12/91	CR-LSA10-73-78	-	1J	3J	-
8/12/91	CR-LSA10-83-88	-	1J	3J	-

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LSA11 - Upgradient of EOM, South Side of U.S. 33

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
8/13/91	CR-LSA11-13-18	-	21	10	1J
	13-18 Dup	-	26	14	-
8/13/91	CR-LSA11-23-28	-	220	57	17J
8/13/91	CR-LSA11-33-38	-	160	28	13J
8/13/91	CR-LSA11-43-48	-	330	76	22J
8/13/91	CR-LSA11-48-53	-	190	49	-
8/13/91	DB (Rock Pump)	-	-	-	-
8/13/91	CR-LSA11-53-58	-	46	-	-
8/13/91	CR-LSA11-58-63	-	10	-	-
8/13/91	CR-LSA11-63-68	-	10	-	-
8/13/91	CR-LSA11-68-73	-	5	-	-
8/13/91	Trip Blank	-	-	-	-
8/14/91	CR-LSA11-78-83	-	2J	3J	-
	78-83 Dup	-	3J	2J	-
8/14/91	CR-LSA11-88-93	-	1J	-	-

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LSA12 - Magyar's Property

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
8/14/91	CR-LSA12-13-18	-	4J	29	-
8/14/91	CR-LSA12-23-28	-	1J	3J	-
8/14/91	CR-LSA12-33-38	-	3J	29	-
8/14/91	CR-LSA12-43-48	-	-	-	-
8/14/91	CR-LSA12-53-58	-	-	-	-
8/14/91	DB (Keck Pump)	-	-	-	-
8/14/91	DB (Keck Hose)	-	-	-	-
8/14/	Trip Blank	-	-	-	-
8/15/91	CR-LSA12-63-68	-	-	-	-
	63-68 Dup	-	-	-	-
8/15/91	CR-LSA12-83-88	-	-	-	-
8/15/91	CR-LSA12-103-108	-	-	-	-
8/15/91	CR-LSA12-123-128	-	-	320	-
8/15/91	CR-LSA12-133-138	-	-	430	-
8/15/91	CR-LSA12-143-148	-	-	420	-
8/15/91	Trip Blank	-	-	-	-

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LSA13 - Yutzy Property

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
8/16/91	CR-LSA13-13-18	-	-	-	-
	13-18 Dup	-	-	-	-
8/16/91	CR-LSA13-23-28	-	1J	12	-
8/16/91	DB (Rock Pump)	-	-	5	-
8/16/91	CR-LSA13-33-38	-	1J	2J	-
8/16/91	CR-LSA13-43-48	-	-	-	-
8/16/91	CR-LSA13-53-58	-	-	-	-
8/16/91	CR-LSA13-63-68	-	1J	11	-
8/16/91	CR-LSA13-73-78	-	-	-	-
8/16/91	Trip Blank	-	-	-	-
8/17/91	CR-LSA13-83-88	-	1J	5	3J
	83-88 Dup	-	-	-	3J
8/17/91	CR-LSA13-93-98	-	39	53	10J
8/17/91	CR-LSA13-103-108	-	15	79	10J
8/17/91	CR-LSA13-113-118	-	650E	250	39J
8/17/91	DB (Rock Pump)	-	1J	3J	-
8/17/91	CR-LSA13-123-128	-	730E	160	96J
8/17/91	CR-LSA13-133-138	-	93	33	21J
8/17/91	Trip Blank	-	-	-	-

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LSA14 - Near NW Corner of Tower Road at County Road 1

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
8/18/91	CR-LSA14-13-18	-	3J	78	-
	13-18 Dup	-	4J	91	-
8/18/91	CR-LSA14-23-28	-	15	79	-
8/18/91	CR-LSA14-33-38	-	100	1,000E	32J
8/18/91	CR-LSA14-43-48	-	190	1,000E	30J
8/18/91	DB (Keck Pump)	-	1J	10	-
8/18/91	Trip Blank	-	-	-	-
8/25/91	CR-LSA14-53-58	-	100	1,500E	52J
	53-58 Dup	-	130	1,900E	78J
8/25/91	CR-LSA14-63-68	-	16	950E	29J
8/25/91	CR-LSA14-73-78	-	8	620E	-
8/25/91	CR-LSA14-83-88	-	5	830E	-
8/25/91	CR-LSA14-93-98	-	4J	1,400E	-
8/25/91	CR-LSA14-103-108	-	1J	920E	-
8/25/91	CR-LSA14-113-118	-	1J	370	-
8/25/91	CR-LSA14-123-128	-	1J	310	-
8/26/91	DB (Keck Pump)	-	-	78	-
8/26/91	CR-LSA14-133-138	-	-	64	-
	133-138 Dup	-	-	132	-
8/26/91	CR-LSA14-143-148	-	-	68	-

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LSA15 - Conrail Yard, North of Car Shop

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
8/20/91	CR-LSA15-13-18	-	-	19	-
	13-18 Dup	-	1J	6	-
8/20/91	CR-LSA15-23-28	-	2J	490	-
8/20/91	CR-LSA15-33-38	1J	4J	750E	-
8/20/91	DB (Rock Pump)	1J	1J	31	-
8/20/91	CR-LSA15-43-48	2J	2J	1,000E	3J
8/20/91	CR-LSA15-53-58	-	2J	650E	2J
8/20/91	CR-LSA15-63-68	-	-	360	-
8/20/91	CR-LSA15-73-78	-	-	120	-
8/20/91	CR-LSA15-83-88	-	-	30	-
8/21/91	CR-LSA15-93-98	-	1J	8	-
	93-98 Dup	-	1J	14	-
8/21/91	CR-LSA15-103-108	-	-	7	-
8/21/91	CR-LSA15-113-118	-	-	-	-
8/21/91	CR-LSA15-123-128	1J	1J	8	-
8/21/91	DB (Rock Pump)	-	-	8	-

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LSA16 - Far East End of Conrail Property, SW of LSA 7

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
8/27/91	CR-LSA16-13-18	-	1J	15	-
	13-18 Dup	-	1J	53	-
8/27/91	CR-LSA16-18-23	-	-	53	-
8/27/91	CR-LSA16-23-28	-	-	10	-
8/27/91	DB (Keck Pump)	-	-	3J	-
8/27/91	CR-LSA16-28-33	-	1J	26	-
8/27/91	CR-LSA16-33-38	-	-	3	-
8/27/91	CR-LSA16-38-43	-	-	3	-
8/27/91	CR-LSA16-43-48	-	-	6	-
8/27/91	CR-LSA16-48-53	-	-	-	-
8/27/91	CR-LSA16-63-68	-	1J	16	-

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LSA17 Conrail Yard, Vicinity of Track 69

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
8/28/91	CR-LSA17-8-13	-	3J	75	-
8/28/91	CR-LSA17-18-23	-	-	7	-
	18-23 Dup	-	-	5	-
8/28/91	CR-LSA17-28-33	-	-	4J	-
8/28/91	CR-LSA17-38-43	3J	1J	4J	-
8/28/91	CR-LSA17-48-53	2J	-	-	-
8/28/91	CR-LSA17-58-63	2J	-	2J	-
8/28/91	CR-LSA17-68-73	-	-	-	-
8/28/91	DB (Rock Pump)	-	-	3J	-
8/28/91	CR-LSA17-78-83	-	-	-	-
8/28/91	CR-LSA17-88-93	-	-	-	-
8/28/91	CR-LSA17-103-108	-	-	-	-
8/28/91	Trip Blank	-	-	-	-

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LSA18 - Conrail Yard, Vicinity of Track 69, East of LSA17 at Beginning of Straightaway

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
8/29/91	CR-LSA18-13-18	-	4J	67	1J
8/29/91	CR-LSA18-23-28	-	-	4J	-
	23-28 Dup	-	-	3J	-
8/29/91	CR-LSA18-33-38	-	-	3J	-
8/29/91	CR-LSA18-43-48	-	-	2J	-
8/29/91	DB (Keck Pump)	-	-	4J	-
8/29/91	CR-LSA18-53-58	-	-	-	-
8/29/91	CR-LSA18-63-68	1J	-	-	-
8/29/91	DB (Driller's Hose)	-	-	-	-
8/29/91	CR-LSA18-73-78	2J	-	-	-
8/29/91	Trip Blank	-	-	-	-
8/30/91	CR-LSA18-93-98	-	-	1J	-
	93-98 Dup	-	-	2J	-
8/30/91	CR-LSA18-113-118	-	-	1J	-
8/30/91	Trip Blank	-	-	2J	-

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LSA19 - Conrail Yard, SE of Car Shop

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
9/4/91	CR-LSA19-13-18	-	19	12	1J
9/4/91	CR-LSA19-23-28	-	26	4J	1J
	23-28 Dup	-	29	3J	1J
9/4/91	CR-LSA19-33-38	-	41	2J	1J
9/4/91	CR-LSA19-43-48	-	3J	-	-
9/4/91	DB (Rock Pump)	5	1J	1J	-
9/4/91	CR-LSA19-53-58	6	3J	2J	-
9/4/91	CR-LSA19-63-68	4J	-	-	-
9/4/91	CR-LSA19-73-78	6	-	-	-
9/4/91	CR-LSA19-93-98	1J	-	-	-
9/4/91	CR-LSA19-103-108	1J	1J	3J	-
9/4/91	Field Blank	-	-	-	-

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LSA20 - North Side of Lusher Avenue, South of Conrail Tracks

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
9/6/91	CR-LSA20-13-18	2J	4J	4J	-
9/6/91	CR-LSA20-18-23	2J	3J	2J	-
	18-23 Dup	1J	2J	-	-
9/6/91	CR-LSA20-23-28	-	1J	-	-
9/6/91	CR-LSA20-28-33	-	1J	-	-
9/6/91	DB (Keck Pump)	1J	2J	-	-
9/7/91	CR-LSA20-33-38	-	1J	4J	-
	33-38 Dup	-	1J	4J	-
9/7/91	CR-LSA20-38-43	1J	2J	16	-
9/7/91	CR-LSA20-48-53	-	1J	3J	-
9/7/91	DB (Keck Pump)	-	-	-	-
9/7/91	CR-LSA20-58-63	-	1J	3J	-
9/7/91	CR-LSA20-68-73	-	-	-	-

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LSA21 - NE Corner of Ponds South of Conrail Yard

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
9/7/91	CR-LSA21-8-13	-	-	-	-
9/7/91	CR-LSA21-18-23	-	-	-	-
9/7/91	CR-LSA21-28-33	-	-	-	-
9/7/91	CR-LSA21-38-43	-	-	-	-
9/8/91	CR-LSA21-48-53	-	-	-	-
	48-53 Dup	-	-	-	-
9/8/91	CR-LSA21-58-63	-	-	-	-
9/8/91	CR-LSA21-78-83	-	-	-	-
9/8/91	CR-LSA21-98-103	-	-	-	-
9/8/91	CR-LSA21-118-123	-	-	-	-
9/8/91	CR-LSA21-135-140	-	-	-	-
9/8/91	DB (Keck Pump)	-	-	-	-
9/8/91	Trip Blank	-	-	-	-

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LSA22 - Conrail Yard, Vicinity of Track 69, East of LSA18, In Curve

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
9/9/91	CR-LSA22-8-13	-	96	-	-
	8-13 Dup	-	140	-	15J
9/9/91	CR-LSA22-18-23	-	3,800E	-	1,700J
9/9/91	CR-LSA22-28-33	-	43	-	13J
9/9/91	CR-LSA22-38-43	-	8	-	-
9/9/91	CR-LSA22-48-53	-	5	-	-
9/9/91	CR-LSA22-DB-Rock	-	8	-	-
9/9/91	CR-LSA22-58-63	-	1J	-	-
9/9/91	CR-LSA22-68-73	-	2J	-	-
9/9/91	CR-LSA22-78-83	-	14	14	-
9/10/91	CR-LSA22-88-93	-	-	-	-

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0101

LSA23 - Conrail Yard, Vicinity of Track 69, East of LSA22, In Curve

Date	Sample No.	Results (ug/L) TCA	CCl_4	TCE	CHL
9/10/91	CR-LSA23-8-13	-	1J	-	-
9/10/91	CR-LSA23-13-18	2J	2J	-	-
	13-18 Dup	1J	3J	-	-
9/10/91	CR-LSA23-18-23	220	5,100E	-	-
9/10/91	CR-LSA23-23-28	190	>9,100E	-	-
9/10/91	DB (Rock Pump)	-	52	-	-
9/10/91	CR-LSA23-28-33	24	1,100E	-	-
9/10/91	CR-LSA23-33-38	14	560E	-	-

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LSA24 - North Side of Lusher Avenue, South of Conrail Tracks, West of LSA20

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
9/10/91	CR-LSA24-8-13	-	48	-	-
9/10/91	CR-LSA24-13-18	-	40	-	-
9/11/91	DB (Keck Pump)	-	26	-	-
9/11/91	CR-LSA24-Drillers System	-	31	-	-
9/11/91	CR-LSA24-18-23	-	14	-	-
9/11/91	CR-LSA24-23-28	-	17	-	-
	23-28 Dup	-	10	-	-
9/11/91	CR-LSA24-28-33	-	6	-	-
9/11/91	CR-LSA24-33-38	-	8	-	-
9/11/91	CR-LSA24-38-43	-	12	-	-
9/11/91	CR-LSA24-43-48	-	5	-	-
9/11/91	CR-LSA24-53-58	-	5	-	-
9/11/91	CR-Drillers Tank	-	-	-	-
9/11/91	CR-Drillers Pump	-	-	-	-
9/11/91	CR-Second DB (Keck Pump)	-	-	-	-

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LSA25 - Within Conrail Classification Yard, East of Car Shop, Between Track Groups 4 and 5

Date	Sample No.	Results (ug/L) TCA	CCl_4	TCE	CHL
9/18/91	CR-LSA25-13-18	-	8	900E	-
	13-18 Dup	-	8	880E	-
9/18/91	CR-LSA25-23-28	-	26	420	-
9/18/91	CR-LSA25-33-38	-	41	160	-
9/18/91	CR-LSA25-43-48	-	4	5,200E*	-
9/18/91	DB (Rock Pump)	-	-	24	-
9/18/91	CR-LSA25-53-58	1J	2J	5,400E*	-
9/18/91	CR-LSA25-63-68	2J	2J	4,000E*	-
9/18/91	CR-LSA25-73-78	-	5	2,000E	-
9/18/91	CR-LSA25-83-88	-	-	320	-
9/18/91	CR-LSA25-93-98	-	6	1,200E	-
9/19/91	DB (Rock Pump)	-	-	240	-
9/19/91	CR-LSA25-103-108	-	-	820E	-
9/19/91	DB (Rock Pump) (with acetone)	-	-	100	-
9/19/91	CR-LSA25-113-118	-	-	1,100E	-
9/19/91	CR-LSA25-123-128	-	8	930E	-
9/20/91	CR-LSA25-133-138	-	-	73	-
9/19/91	CR-LSA25-143-148	-	6	490	-

* Co-eluting peak interference in quantitation

7422:9

LSA26 - Conrail Yard, ENE of Car Shop

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
9/20/91	DB (Keck Pump)	-	-	4	-
9/20/91	Db (Keck Pump) (hot water)	-	6	64	-
9/20/91	CR-LSA26-8-13	-	9	25	-
9/21/91	CR-LSA26-18-23	-	69	63	-
9/21/91	CR-LSA26-28-33	-	22	330	-
9/21/91	CR-LSA26-38-43	-	-	7,200E	25J
9/21/91	CR-LSA26-48-53	-	-	6,800E	24J
9/21/91	DB (Keck Pump)	-	-	1,000E	-
9/21/91	CR-LSA26-58-63	-	-	4,000E	-
9/21/91	CR-LSA26-68-73	-	-	3,600E	14J
9/21/91	CR-LSA26-78-83	-	5	2,200E	-
9/21/91	CR-LSA26-88-93	-	4J	1,900E	-

7422:9

LSA27 - South of Ponds South of Conrail Yard, Between West and Central Ponds

Date	Sample No.	Results (ug/L) TCA	CCl_4	TCE	CHL
9/22/91	DB (New Rock Tube)	-	-	-	-
9/22/91	CR-LSA27-8-13	-	-	4J	-
	8-13 Dup	-	-	3J	-
9/22/91	CR-LSA27-18-23	-	-	-	-
9/22/91	CR-LSA27-28-33	-	-	-	-
9/22/91	CR-LSA27-38-43	-	-	29	-
9/22/91	DB (Rock Pump)	-	-	-	-
9/22/91	CR-LSA27-48-53	-	-	-	-
9/22/91	CR-LSA27-58-63	-	-	-	-
9/22/91	CR-LSA27-68-73	-	-	-	-
9/22/91	CR-LSA27-78-83	-	-	-	-
9/22/91	Trip Blank	-	-	-	-

7422:9

LSA28 - Conrail Yard, Vicinity of Track 69, NE of LSA23, In Curve

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
9/23/91	CR-LSA28-8-13	-	-	39	-
	8-13 Dup	-	-	8	-
9/23/91	CR-LSA28-18-23	-	-	9	-
9/23/91	CR-LSA28-28-33	-	-	2J	-
9/23/91	CR-LSA28-38-43	-	-	3J	-
9/23/91	CR-LSA28-48-53	-	-	-	-
9/23/91	CR-LSA28-58-63	-	-	-	-
9/23/91	DB (Keck Pump)	-	-	-	-
9/23/91	CR-LSA28-68-73	-	-	-	-
9/23/91	CR-LSA28-78-83	-	-	-	-
9/23/91	Trip Blank	-	-	-	-

7422:9

LSA29 - Classification Yard, Between Track Groups 7 and 8, 1,900 Feet West of Beginning of Straightaway

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
9/24/91	CR-LSA29-8-13	-	-	1,700E	150J
	8-13 Dup	-	-	1,600E	150J
9/24/91	CR-LSA29-18-23	-	-	530E	41J
9/24/91	CR-LSA29-28-33	-	-	640E	-
9/24/91	CR-LSA29-38-43	-	-	7,500E	130J
9/24/91	CR-LSA29-48-53	-	-	330	-
9/24/91	DB (Rock 1)	-	-	190	-
9/24/91	DB (Rock 2)	-	-	31	-
9/24/91	CR-LSA29-58-63	-	-	140	-
9/24/91	CR-LSA29-68-73	-	-	46	-
9/24/91	CR-LSA29-78-83	-	-	1,500E	-

7422:9

LSA30 - Classification Yard, Between Track Groups 7 and 8, 2,400 Feet West of Beginning of Straightaway

Date	Sample No.	Results (µg/L) TCA	CCl_4	TCE	CHL
9/25/91	CR-LSA30-8-13	-	-	14	-
	8-13 Dup	-	-	23	-
9/25/91	CR-LSA30-18-23	-	-	110	-
9/25/91	CR-LSA30-21-26*	-	3,100E	1,200E	1,800E

* Drill met refusal at 26 feet below ground surface.

7422:9

APPENDIX B

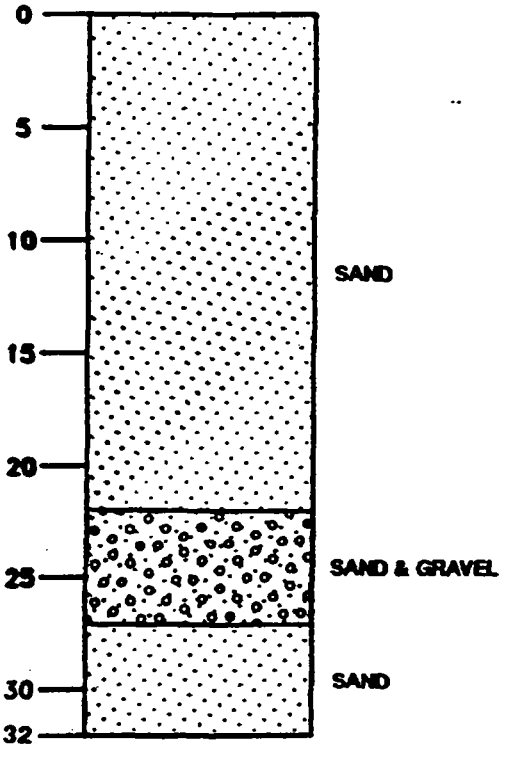
GEOLOGIC SOIL BORING LOGS

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Boring No. B20
Location 19.5' E., 23.75' S. of NE pillar of Car Shop
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist L. Lueck
Start & Completion Date 9/16/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Diam. 8"
Boring Depth 32'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling 10.8'

Project Name Conrail site
Project Number SP3000

Boring No. B20

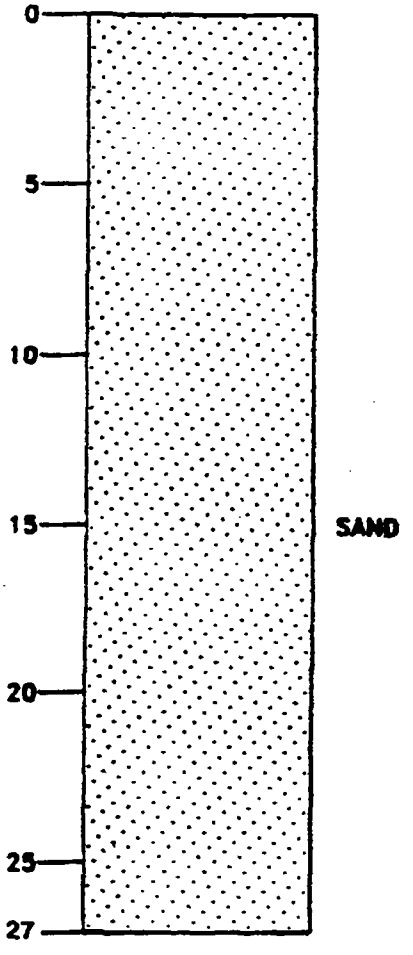
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	26/40/32	12	Black fine to medium sand, some gravel, grading down to silty sand: dry.	Probable fill material. OVA 0 ppm.
2	2.5 - 4.5	12/13/26	9	Top 4": Brown fine sand, some silt; moist (SM). Bottom: Black silty sand, some gravel: moist (SM).	OVA 5 ppm.
3	5 - 7	8/5/8	9	Brown fine to medium sand, trace silt, trace gravel in upper few inches: moist (SP).	OVA 6 ppm.
4	7.5 - 9.5	6/6/10/8	13	Tannish brown fine to medium sand, some gravel: moist (SW).	OVA 10 ppm.
5	10 - 12	9/8/6/7	13	Tan fine to coarse sand, trace fine to medium gravel: saturated (SW).	OVA 4 ppm.
6	12.5 - 14.5	8/8/10/14	16	Brown to black fine to coarse sand, some fine to coarse gravel, trace silt: saturated (SW).	OVA 0 ppm.
7	15 - 17	12/10/8/14	17	Brown fine to medium sand, trace coarse sand, trace medium gravel: saturated (SW).	OVA 0 ppm.
8	17.5 - 19.5	5/13/14/6	15	Same as above, lighter brown (SW).	OVA <1 ppm.
9	20 - 22	14/14/30/28	12	Light brown fine to medium sand, little gravel: saturated (SP).	OVA 0 ppm.
10	22.5 - 24.5	6/11/21/26	16	Light brown medium to coarse sand and fine to medium gravel: saturated (SW-GW).	OVA 0 ppm.
11	25 - 27	11/17/25/25	18	Same as above except trace silt: saturated (SW-GW).	OVA 1 to 2 ppm.
12	27.5 - 29.5	11/21/23/20	13	Brown medium to coarse sand, trace gravel; some downward coarsening: saturated (SW).	OVA 0 ppm.
	30 - 32	14/19/21/36	19	Brown medium to coarse sand, little fine to medium gravel, trace silt: saturated (SW).	E.O.B. @ 32'. OVA 0 ppm.

Project Name Conrail site
Project No. ZF3000

Date Prepared _____
Prepared by _____

Boring No. B21
Location 25.5' E., 9.5' N. of NE pillar of Car Shop
Owner U.S. EPA
Ground Elevation _____
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist L. Lueck
Start & Completion Date 3/16/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling 10'

Project Name Conrail site
Project Number 2F3000

Boring No. B21

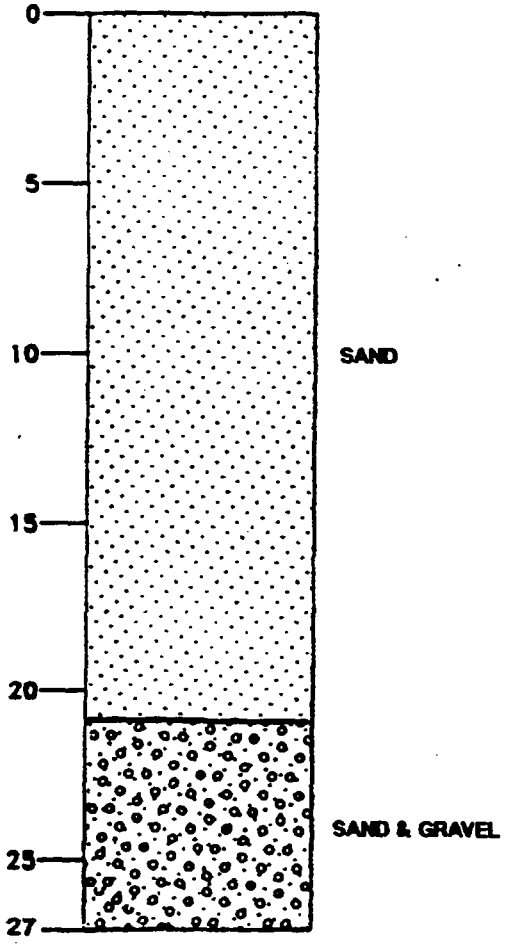
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	10/27/ 19/19	17	Top 15": Black to gray silt, sand, and gravel, probably fill: dry. Bottom: Brown fine to medium sand; moist (SP).	Used 3" split spoon to get larger sample. OVA 3 ppm.
2	2.5 - 4.5	17/19/ 26/27	16	Reddish brown fine to medium sand, trace gravel; moist (SP).	OVA 1 ppm.
3	5 - 7	11/9/9/9	18	Top 2": Black to brown silty clay and clayey silt, some gravel; moist (ML-CL). Bottom: Reddish brown fine to medium sand; moist (SP).	OVA 4 ppm.
4	7.5 - 9.5	5/5/7/9	20	Top 2": Brown silty clay and clayey silt; moist (ML-CL). Bottom: Medium brown fine to medium sand, trace fine gravel (SW).	OVA <1 ppm.
5	10 - 12	9/15/ 27/25	16	Brown medium to coarse sand and fine to coarse gravel; trace silt; saturated (SW-GW).	OVA 4 ppm.
6	12.5 - 14.5	10/37/ 26/25	15	Top 9": Brown medium to coarse sand and fine to medium gravel (SW-GW). Bottom: Medium brown fine to medium sand; saturated (SP).	OVA 0 ppm.
7	15 - 17	5/6/10/15	15	Medium brown fine to medium sand, trace coarse sand; saturated (SP).	2" split spoon sample due to blowup. OVA 0 ppm.
	17.5 - 19.5	7/9/15/12	15	Medium to coarse sand, little fine to coarse gravel, trace silt; saturated (SW).	OVA 0 ppm.
9	20 - 22	15/23/ 25/25	19	Same as above (SW).	OVA 0 ppm.
10	22.5 - 24.5	3/10/ 15/17	15	Brown fine to medium sand grading downward to fine to medium gravel; saturated (SW-GW).	OVA 0 ppm.
11	25 - 27	3/10/ 15/18	15	Brown fine to coarse sand, little fine to medium gravel, trace silt; saturated (SW).	E.O.B. @ 27'. OVA 1 ppm.

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Boring No. B22
Location 9' N., 8' W. of NW pillar of Car Shop
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist L. Lueck
Start & Completion Date 09/17/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Diam. 8"
Boring Depth 27'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling ~8.5'

Project Name: Conrail site
Project Number: ZF3000

Boring No. B22

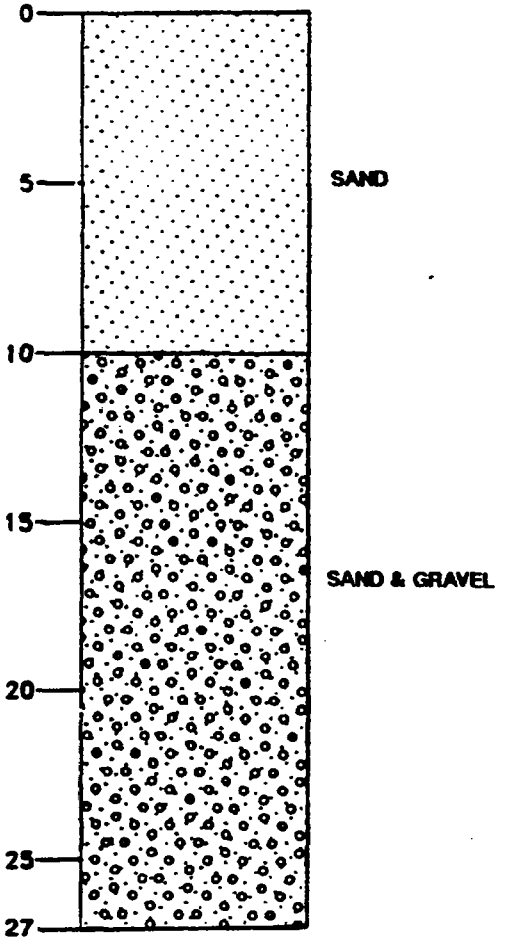
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	15/24/ 24/32	10	Top 8": Black silty sandy gravel. Bottom 2": Crushed limestone gravel.	3" split spoon. OVA 0 ppm.
2	2.5 - 4.5	12/10/ 11/11	17	Top 4": Black silty clayey gravel. Bottom: Brown fine to medium sand, trace gravel; slightly moist (SW).	OVA 5 ppm.
3	5 - 7	5/8/8/10	18	Same as above; moist (SW).	OVA 8.5 ppm.
4	7.5 - 9.5	8/9/8/11	19	Same as above, but slightly coarser; bottom 10" saturated (SW).	OVA 3 ppm.
5	10 - 12	4/5/9/17	17	Brown medium sand, grading down to medium to coarse sand and fine to medium gravel; saturated (SW-GW).	OVA 0 ppm.
6	12.5 - 14.5	9/13/ 15/19	14	Brown medium sand, little fine to medium gravel, grading down to fine to medium sand; saturated (SW).	OVA 0 ppm.
7	15 - 17	5/11/ 18/23	16	Brown fine to medium sand, coarsening downward; saturated (SW).	OVA 0 ppm.
8	17.5 - 19.5	23/23/ 16/20	17	Brown medium to coarse sand, little gravel; saturated (SW).	OVA 0 ppm.
9	20 - 22	5/15/ 21/27	18	Brown fine to medium sand, trace gravel, grading down to medium to coarse gravel, little coarse sand; saturated (SW-GW).	OVA 0 ppm.
10	22.5 - 24.5	9/18/ 24/24	13	Fine to coarse gravel; some coarse sand; saturated (GW).	OVA 0 ppm.
11	25 - 27	8/26/ 30/35	17	Medium to coarse sand and fine to medium gravel; saturated (SW-GW).	E.O.B. @ 27'. OVA 0 ppm.

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Boring No. B23
Location West of Car Shop
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist L. Lueck
Start & Completion Date 09/17/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Diam. 8"
Boring Depth 27'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling ~10'

Project Name Conrail site
Project Number ZF3000

Boring No. B23

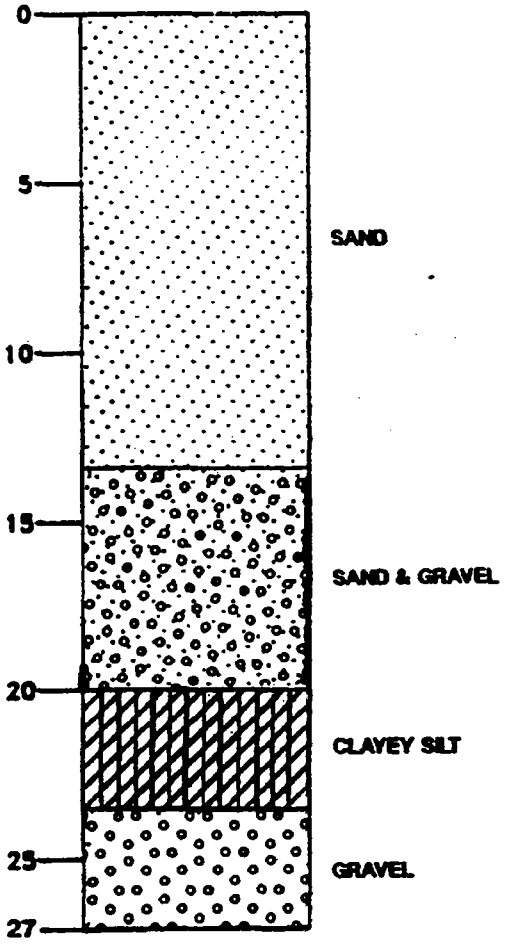
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	45/69/ 50/40	19	Gravel, little sand, grading down to brown fine to medium sand, trace gravel; dry; (GW-SW).	3" split spoon. Equipment malfunction prevented OVA data collection.
2	2.5 - 4.5	18/24/ 24/25	16	Reddish brown fine to medium sand, trace silt, trace fine to medium gravel; moist (SW).	
3	5 - 7	7/8/8/9	19	Reddish brown fine to medium sand, trace gravel in top 2"; moist (SW).	
4	7.5 - 9.5	17/20/ 11/12	19	Reddish brown fine to medium sand, little fine to coarse gravel; moist (SW).	
5	10 - 12	13/17/ 16/18	18	Medium brown fine to coarse sand and fine to medium gravel; saturated (SW-GW).	
6	12.5 - 14.5	17/15/ 18/20	17	Top 5": Medium to coarse sand and fine to coarse gravel; saturated (SW-GW). Bottom: Fine to medium sand, some fine to medium gravel; saturated (SW).	
7	15 - 17	17/32/ 44/60	12	Medium to coarse sand and fine to coarse gravel; saturated (SW-GW).	
8	17.5 - 19.5	38/44/ 55/65	11	Fine to coarse gravel, little fine to coarse sand; saturated (GW).	
9	20 - 22	69/100/ refusal	9	Top 5": Fine to medium sand; saturated (SP). Bottom: Fine to coarse gravel, trace sand; saturated (GW).	
10	22.5 - 24.5	3/5/ 79/100	14	Medium to coarse sand and fine to medium gravel, trace silt in bottom 2"; saturated (SW-GW).	2" split spoon this sample and next to try to recover more fines.
11	25 - 27	13/16/100	11	Coarse sand and fine to medium gravel; saturated (SP-GW).	E.O.B. @ 27'

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Boring No. B24
Location Track 69 area
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/01/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Diam. 8"
Boring Depth 27'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling 7'

Project Name Conrail site
Project Number 2F3000

Boring No. B24

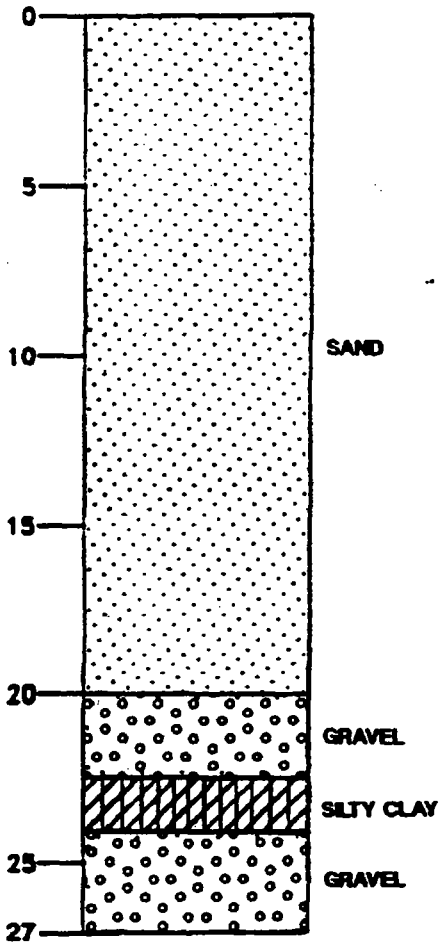
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	9/12/ 17/24	18	Yellowish brown fine to medium sand, trace coarse sand, trace clay and silt; dense; moist (SW).	Top 4" = top soil and railroad ballast. OVA 0 ppm.
2	2.5 - 4.5	10/11/ 12/9	24	Same as above (SW).	OVA 0 ppm.
3	5 - 7	6/9/8/7	21	Top 5": Same as above (SW). Bottom: Brown coarse sand and coarse to fine gravel, little fine to medium sand, trace silt; medium dense; moist (SW-GW).	OVA 0 ppm.
4	7.5 - 9.5	14/20/ 21/25	15	Yellowish brown fine to medium sand, trace coarse sand, trace clay and silt; dense; saturated (SW).	OVA 0 ppm.
5	10 - 12	16/21/ 25/30	15	Same as above (SW).	OVA 3 ppm.
6	12.5 - 14.5	10/16/ 30/35	15	Top 12": Same as above (SW). Bottom: Brown coarse to fine gravel and coarse sand, trace fine sand; very dense; saturated (GW-SP).	OVA 0 ppm.
7	15 - 17	40/20/ 22/25	15	Top 12": Brown medium to coarse sand and fine gravel, trace fine sand and silt; dense; saturated (SW-GP). Bottom: Brown fine to medium gravel and coarse sand with 1/2" and 2" clay stringers at 16' and 16.8', respectively; medium plasticity; moist to wet (GW-SP).	OVA 0 ppm.
8	17.5 - 19.5	20/30/ 30/30	24	Same as above except with little clay, little coarse gravel, trace cobbles; saturated (GW-SP).	OVA 0 ppm.
9	20 - 22	5/12/ 14/20	16	Brown clayey silt, some fine sand, trace coarse sand and fine gravel; dense; wet to saturated (ML-SM).	OVA 0 ppm.
10	22.5 - 24.5	5/12/ 20/30	24	Top 12": Same as above (ML-SM). Bottom: Brown coarse to fine gravel, little coarse to fine sand, trace silt and clay; medium dense; saturated (GW).	OVA 0 ppm.
11	25 - 27	10/12/ 24/26	19	Same as above (GW).	E.O.B. @ 27'. OVA 0 ppm.

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Boring No. B25
Location Track 69 area. East of B24
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist R. Hackler
Start & Completion Date 10/01/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Diam. 8"
Boring Depth 27'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling estimated at 7'-9'

Project Name Conrail site
Project Number 2F3000

Boring No. 825

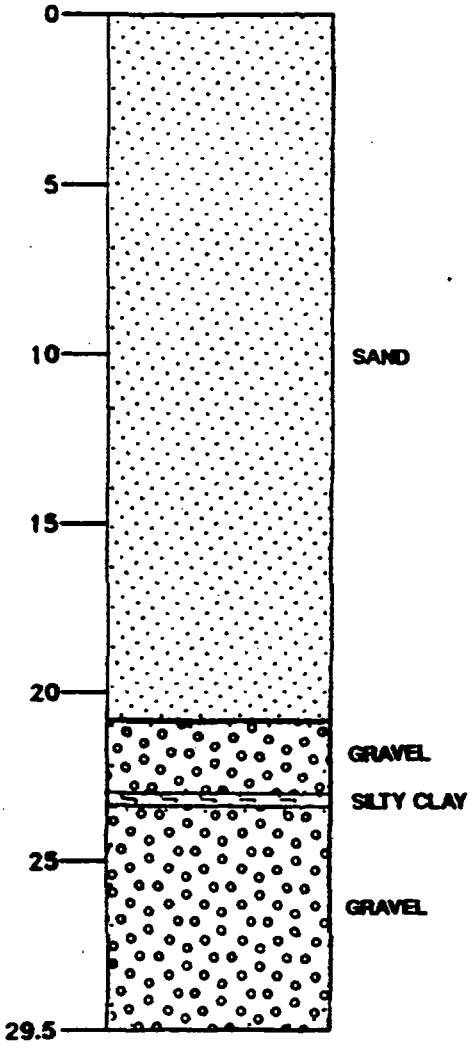
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	8/10/ 16/22	19	Yellowish brown fine to medium sand, trace coarse sand, trace silt and clay; dense; moist (SW).	Top 3"=top soil and railroad ballast. OVA 0 ppm.
2	2.5 - 4.5	12/15/ 16/20	20	Same as above (SW).	OVA 0 ppm.
3	5 - 7	6/8/16/18	22	Top 12": Same as above (SW). Next 4": Gravel and cobbles (GW). Bottom: Light yellowish brown fine to medium sand, trace coarse sand, trace silt and clay; dense; moist to wet (SW).	OVA 1 ppm.
4	7.5 - 9.5	10/25/ 25/30	21	Same as above except very dense and saturated (SW).	OVA 0 ppm.
5	10 - 12	6/8/20/25	17	Same as above (SW).	OVA 0 ppm.
6	12.5 - 14.5	6/8/ 25/30	17	Same as above (SW).	OVA 0 ppm.
7	15 - 17	7/15/ 25/35	23	Same as above (SW).	OVA 0 ppm.
8	17.5 - 19.5	7/12/ 15/17	21	Same as above (SW).	OVA 0 ppm.
9	20 - 22	10/12/ 15/17	19	Yellowish brown coarse to fine gravel, trace sand and silt; two 1" clay stringers 6" apart near top of sample; dense; saturated (GW).	OVA 0 ppm.
10	22.5 - 24.5	6/6/7/12	12	Grayish brown silty clay, trace coarse gravel; very stiff; low plasticity; wet (CL).	Driller was cleaning out blow-up. It was taken to be a sample due to uncertainty in the in-place nature of the samples. OVA for both 0 ppm.
10a	23.5 - 25.5	7/10/ 20/25	17	Top 3": Same as above (CL). Bottom: Yellowish brown coarse to fine gravel, some coarse to fine sand, trace silt and clay (GW).	
11	25 - 27	7/12/ 16/17	17	Same as above (GW).	E.O.B. @ 27'. OVA 0 ppm.

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Boring No. B16
Location Track 69 area. East of B25
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist R. Hackler
Start & Completion Date 10/01/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Diam. 8"
Boring Depth 29.5'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling ~8.5'

Project Name Conrail site
Project Number ZP3000

Boring No. B26

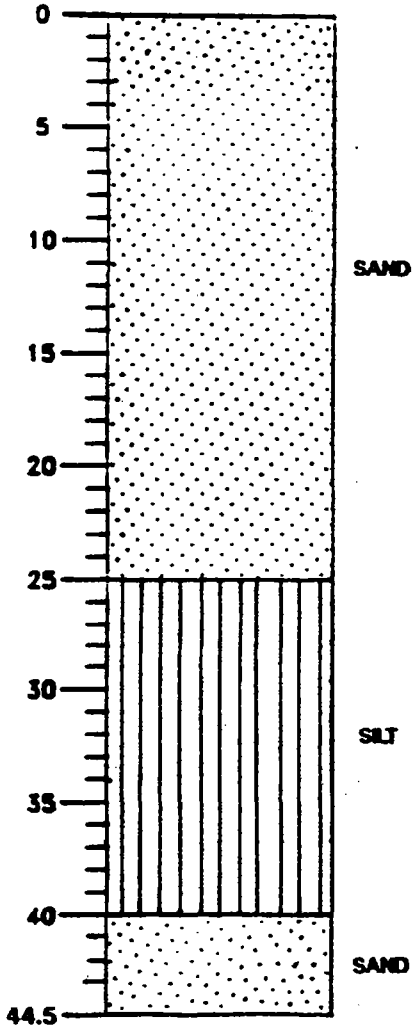
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	18/20/ 24/25	20	Top 7": Black soil and railroad ballast. Bottom: Yellowish brown fine to medium sand, trace coarse sand, gravel, silt: very dense; moist (SP).	OVA 0 ppm.
2	2.5 - 4.5	8/12/ 10/10	17	Same as above except sand coarsening downward, becoming reddish (SW).	OVA 1/2 ppm.
3	5 - 7	5/8/10/16	18	Top 12": Same as above grading down to gravel and cobbles (SW-GW). Bottom: Yellowish brown fine to medium sand, trace coarse sand, silt, clay: dense; moist (SW).	OVA 0 ppm.
4	7.5 - 9.5	7/15/ 20/22	19	Same as above except saturated (SW).	OVA 0 ppm.
5	10 - 12	10/12/ 15/24	24	Same as above except also trace gravel (SW).	OVA 0 ppm.
6	12.5 - 14.5	10/30/ 30/35	19	Same as above (SW).	OVA 0 ppm.
7	15 - 17	6/15/ 20/25	21	Same as above (SW).	OVA 0 ppm.
8	17.5 - 19.5	5/5/8/15	22	Same as above (SW).	Little coarse gravel in shoe. OVA 0 ppm.
9	20 - 22	10/15/ 15/15	24	Top 12": Same as above (SW). Bottom: Yellowish brown coarse to fine gravel with little coarse to medium sand; (1" clay stringer in middle of sample); dense; saturated (GW).	OVA 0 ppm.
10	22.5 - 24.5	25/25/ 28/31	19	Top 6": Same as above (GW). Next 4": Silty clay (CL). Bottom: Yellowish brown coarse to fine gravel, little coarse to medium sand, traces silt, clay; very dense: saturated (GW).	OVA 0 ppm.
11	25 - 27	10/15/ 30/35	18	Same as above (GW).	OVA 0 ppm.
12	27.5 - 29.5	7/15/ 40/45	19	Same as above (GW).	E.O.B. @ 29.5'. OVA 0 ppm.

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Boring No. B27
Location W. yard between tracks 63 and 64
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist R. Hackler
Start & Completion Date 10/02/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Diam. 8"
Boring Depth 44.5'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling 7'

Project Name Conrail site
Project Number 2F3000

Boring No. B27 Page 1 of 2

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	6/11/ 12/20	17	Top 6": Black soil and railroad ballast. Bottom: Yellowish brown fine to medium sand, trace coarse sand, silt, clay; moist (SW).	3" split spoon except where noted. OVA 0 ppm.
2	2.5 - 4.5	12/12/ 13/13	19	Top 12": Same as above (SW). Bottom: Yellowish brown medium to coarse sand, little fine gravel, trace medium gravel, sand, silt, clay; medium dense; moist (SW).	OVA 0 ppm.
3	5 - 7	6/14/ 18/20	18	Same as above except trace coarse gravel; dense; wet to saturated (SW).	OVA 0 ppm.
4	7.5 - 9.5	18/25/ 27/32	20	Same as above except with 2" dark brown silt stringer at 8.5'; saturated (SW).	OVA 0 ppm.
5	10 - 12	40/30/ 40/35	11	Yellowish brown medium to coarse sand, some coarse gravel, little fine gravel, trace medium gravel, sand, silt, clay; very dense; saturated (SW).	Large granite cobble stuck in drive shoe. OVA 0 ppm.
6	12.5 - 14.5	40/30/ 32/30	15	Same as above (SW).	OVA 0 ppm.
7	15 - 17	23/23/ 20/30	23	Same as above except trace coarse gravel (SW).	OVA 0 ppm.
8	17.5 - 19.5	8/16/ 25/30	24	Same as above (SW).	1.5' blowup. OVA 0 ppm.
9	20 - 22	29/95/ refusal	19	Same as above (SW).	Difficult drilling. Used 2" split spoon this sample. OVA 0 ppm.
10	22.5 - 24.5	N.D.	0	No sample attempted due to boulder or cobbles (GP).	Difficult drilling. OVA reading not taken.
11	25 - 27	N.D.	6	Yellow-brown silt, some fine to medium sand, traces clay, coarse sand, fine gravel; extremely dense; wet (ML-SM).	2" split spoon. OVA 0 ppm.
12	27.5 - 29.5	80+/ refusal	24	Same as above; saturated (ML-SM).	Blowup? OVA 0 ppm.
13	30 - 32	100+/ refusal	2	Same as above (ML-SM).	Recovery probably is blowup. OVA reading not taken.
14	32.5 - 34.5	100/30/ 40/30	24	Brown silt, little clay and fine sand, trace medium and coarse sand; extremely dense; saturated (ML).	2" split spoon. OVA 0 ppm.

Project Name Conrail site
Project Number ZF3000

Boring No. B27 Page 2 of 2

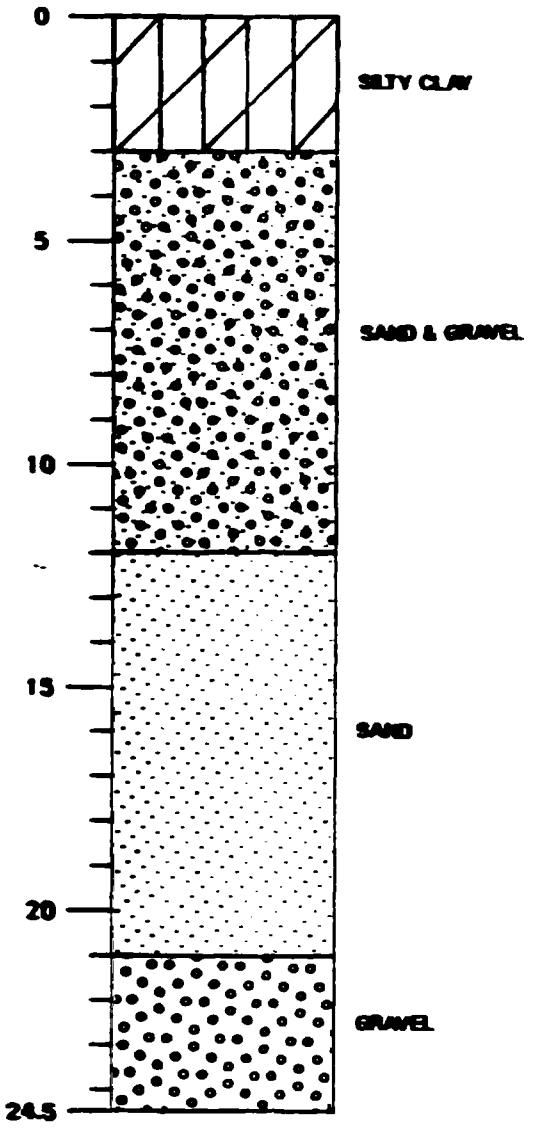
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
15	35 - 37	40/80/ 95/120	22	Same as above (ML).	2" split spoon. OVA 0 ppm.
16	37.5 - 39.5	80/50/ 80/85	12	Same as above (ML).	2" split spoon, 3" was unsuccessful. OVA 0 ppm.
17	40 - 42	50/25/ 25/30	10	Grayish-brown fine sand, little silt, trace clay and medium sand; very dense; wet (SM).	2" split spoon. OVA 0 ppm.
18	42.5 - 44.5	N.D. N.D. = no data	8	Same as above (SW).	E.O.B. @ 44.5'. OVA reading not taken.

Project Name Conrail site
Project No. ZP3080

Date Prepared
Prepared by

Boring No. B28
Location W. yard between tracks 63 and 64
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/03/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Diam. 8"
Boring Depth 24.5'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling 6.75'

Project Name Conrail site
Project Number ZP3000

Boring No. B28

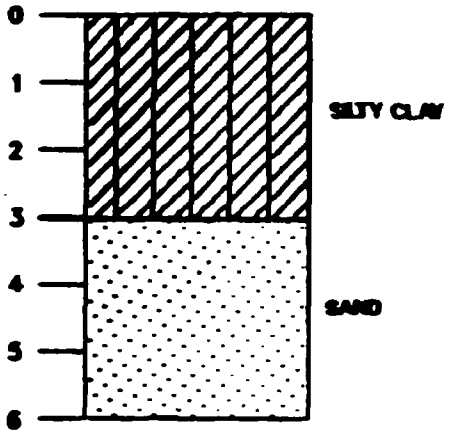
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	8/6/ 23/55	20	Top 6": Black soil and railroad ballast. Next 6": Brown coarse to fine sand, some clay and silt; dense; moist to wet (SW). Bottom: Dark gray silty clay to clayey silt, trace coarse to fine sand, trace fine gravel; very dense; dry (ML-CL).	OVA 200 ppm.
2	2.5 - 4.5	110/50/ 42/42	16	Top 3": Same as above with coarse gravel; saturated (ML-CL). Bottom: Yellowish brown fine to medium sand, trace coarse sand and silt; very dense; moist to wet (SW).	OVA 500 ppm.
3	5 - 7	15/15/ 28/50	20	Yellowish brown clayey sand and gravel, some cobbles, very dense; saturated (SW-GW).	OVA 4 ppm.
4	7.5 - 9.5	14/24/ 30/35	25	Brown coarse sand and gravel; little fine to medium sand, trace silt; dense; saturated (SW).	OVA 1/2 ppm.
5	10 - 12	14/23/ 23/25	18	Same as above, grading down to medium to coarse sand with little coarse to fine gravel; dense; saturated (SW).	OVA 0 ppm.
6	12.5 - 14.5	14/23/ 30/35	20	Brown coarse to medium sand, some coarse to fine gravel, grading downward to fine to medium sand, trace fine gravel; dense; saturated (SW).	OVA 0 ppm.
7	15 - 17	25/35/ 45/55	24	Brown medium to coarse sand, little coarse to fine gravel, little fine sand; dense; saturated (SW).	OVA 0 ppm.
8	17.5 - 19.5	16/25/ 26/30	24	Same as above (SW).	OVA <1 ppm.
9	20 - 22	5/8/ 15/26	24	Top 9": Same as above except trace fine gravel (SW). Bottom: Brown coarse to fine gravel, some coarse to fine sand, trace cobbles; dense; saturated (GW).	OVA 0 ppm.
10	22.5 - 24.5	7/12/ 15/20	20	Same as above (GW).	E.O.B. @ 24.5'. OVA 0 ppm.

Project Name Conrail site
Project No. ZF3008

Date Prepared
Prepared by

Boring No. B29
Location W. yard between tracks 63 and 64
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Borgerson Caswell
Geologist C. Carlson
Start & Completion Date 10/03/91
Type of Rig CME75

Method of Drilling Split spoons only



BORING DATA

Boring Diam. 3"
Boring Depth 6'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling Not encountered

Project Name Conrail site
Project Number ZF3000

Boring No. B29

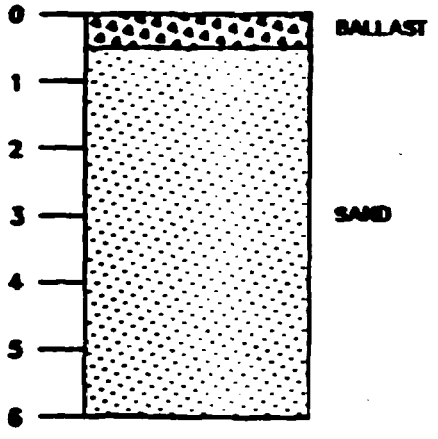
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	8/8/ 28/62	24	Top 3": Brown sandy soil. Next 3": Light gray crushed gravel fill. Next 6": Yellowish brown silty coarse to fine sand; wet (SM). Bottom: Dark gray clayey silt to silty clay, some fine sand, trace coarse sand and fine gravel; very dense; dry (ML-CL).	OVA >1,000 ppm.
2	2 - 4	8/18/ 55/62	20	Top 9": Same as above but wet to saturated (ML-CL). Bottom: Very pale brown to coarse to fine sand, some coarse to fine gravel, trace silt; dense; moist to dry (SW).	OVA >1,000 ppm.
3	4 - 6	16/19/ 40/50	12	Same as above (SW).	E.O.B. @ 6'. OVA <1 ppm.

Project Name Conrail site
Project No. EP3000

Date Prepared
Prepared by

Boring No. B30
Location W. yard between tracks 63 and 64
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/03/91
Type of Rig CME75

Method of Drilling Split spoons only



BORING DATA

Boring Diam. 3"
Boring Depth 6'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling Not encountered

Project Name Conrail site
Project Number ZPJ000

Boring No. B30

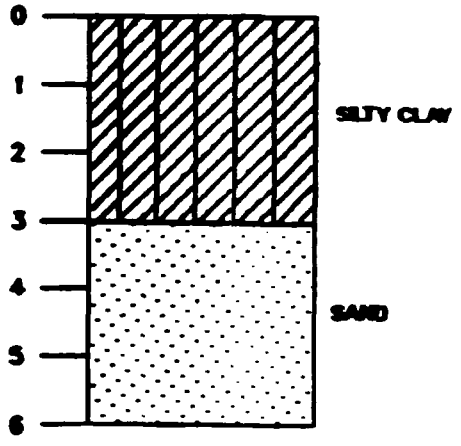
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	6/8/ 30/32	24	Top 4": Brown sandy soil and rock; moist. Next 3": Light gray crushed gravel. Next 7": Yellowish brown silty coarse to fine sand: dense: moist (SW). Next 4": Dark gray silty clay to clayey silt (ML-CL). Bottom: Pale brown coarse to fine sand, some coarse to fine gravel, trace silt; dense: moist (SW).	OVA 7 ppm.
2	2 - 4	26/36/ 30/30	24	Same as above (SW).	OVA 70 ppm in borehole.
3	4 - 6	12/28/ 29/35	12	Same as above (SW).	E.O.B. @ 6'. OVA 5 ppm.

Project Name Conrail site
Project No. 2F3000

Date Prepared
Prepared by

Boring No. B31
Location W. yard between tracks 63 and 64
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/03/91
Type of Rig CME75

Method of Drilling Split spoons only



BORING DATA

Boring Diam. 3"
Boring Depth 6'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling Not encountered

Project Name Conrail site
Project Number ZF3000

Boring No. B31

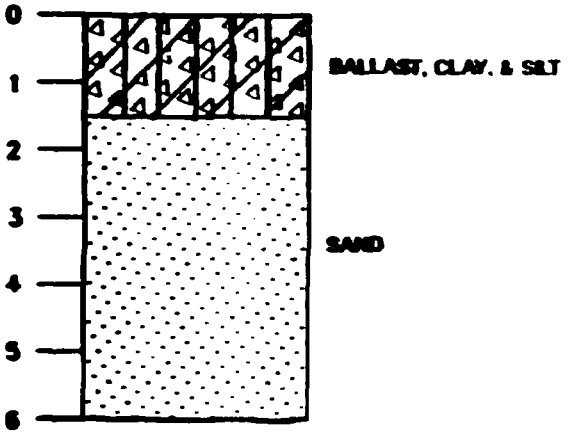
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	5/10/ 20/36	24	Top 6": Black soil and gravel. Next 8": Dark brown coarse sand, trace fine to medium sand and fine gravel; saturated (SW). Bottom: Dark gray silty clay to clayey silt, trace coarse to fine sand and fine gravel; dense; moist to wet (ML-CL).	OVA >1,000 ppm in borehole.
2	2 - 4	12/17/ 21/35	24	Top 10": Same as above; saturated (ML-CL). Bottom: Very pale brown coarse sand, some coarse to fine gravel, trace fine sand; dense; moist (SW).	OVA 200 ppm.
3	4 - 6	20/23/ 30/31	12	Same as above (SW).	E.O.B. @ 6'. OVA reading of sample not taken.

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Boring No. B32
Location W. yard between tracks 63 and 64
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/03/91
Type of Rig CME75

Method of Drilling Split spoons only



BORING DATA

Boring Diam. 3"
Boring Depth 6'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling Not encountered

Project Name Conrail site
Project Number ZP3000

Boring No. B32

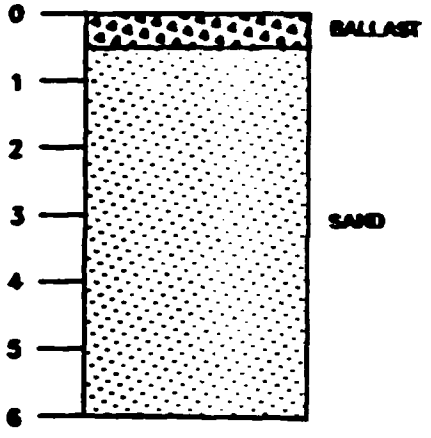
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	10/12/ 18/36	20	Top 8": Black soil and crushed gravel. Next 8": Dark gray clayey silt to silty clay, some coarse to fine sand, trace coarse to fine gravel; saturated (ML-CL). Bottom: Yellowish brown to coarse to fine sand, trace coarse to fine gravel and silt; dense; wet (SW).	OVA 700 ppm in borehole.
2	2 - 4	30/32/ 30/35	20	Top 6": Same as above (SW). Bottom: Very pale brown coarse sand and fine gravel, trace fine to medium sand; dense; moist (SW).	OVA 70 ppm in in c. sand at 4'.
3	4 - 6	12/18/ 17/15	16	Same as above (SW).	E.O.B. @ 6'. OVA reading of sample not taken.

Project Name Conrail site
Project No. EP3000

Date Prepared
Prepared by

Boring No. B33
Location W. yard between tracks 63 and 64
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/03/91
Type of Rig CME75

Method of Drilling Split spoons only



BORING DATA

Boring Diam. 3"
Boring Depth 6'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling Not encountered

Project Name Conrail site
Project Number ZP3000

Boring No. B33

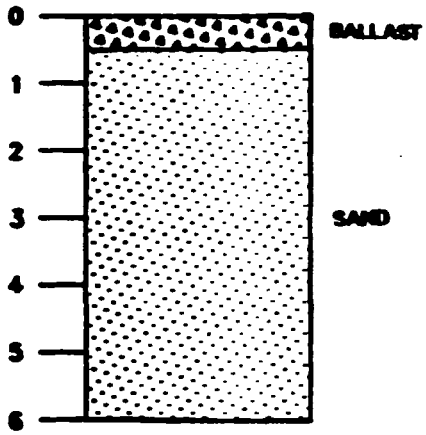
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	7/15/ 21/23	24	Top 4": Black topsoil. Next 5": Light gray crushed gravel (fill). Bottom: Yellowish brown coarse sand, some medium to fine sand, trace coarse to fine gravel; saturated (SW).	OVA 0 ppm.
2	2 - 4	9/15/ 19/30	24	Same as above (SW).	OVA 0 ppm.
3	4 - 6	16/21/ 27/48	12	Same as above (SW).	E.O.B. @ 6'. OVA 0 ppm.

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Boring No. B34
Location W. yard between tracks 63 and 64
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/03/91
Type of Rig CME75

Method of Drilling Split spoons only



BORING DATA

Boring Diam. 3"
Boring Depth 6'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling Not encountered

Project Name Conrail site
Project Number ZP3000

Boring No. B34

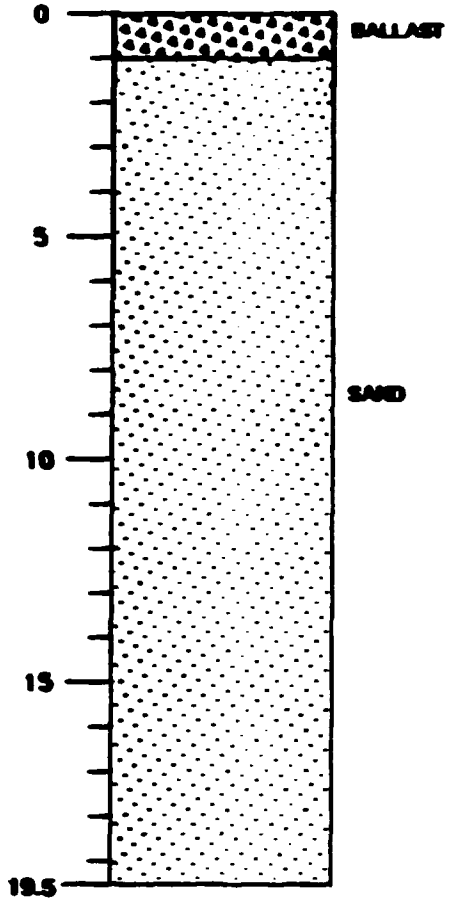
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	6/8/ 17/21	20	Top 4": Black soil and railroad ballast. Next 4": Light gray crushed gravel (fill). Bottom: Yellowish brown coarse sand, some medium to fine sand, trace coarse to fine gravel; saturated (SW).	Equipment malfunction prevented collection of OVA readings.
2	2 - 4	24/26/ 23/20	24	Same as above (SW).	
3	4 - 6	20/22/ 17/50	14	Same as above (SW).	E.O.B. @ 6'

Project Name Conrail site
Project No. 273000

Date Prepared
Prepared by

Boring No. B35
Location Southeast corner of Car Shop
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/04/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Diam. 8"
Boring Depth 19.5'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling 11'

Project Name Conrail site
Project Number ZP3000

Boring No. B35

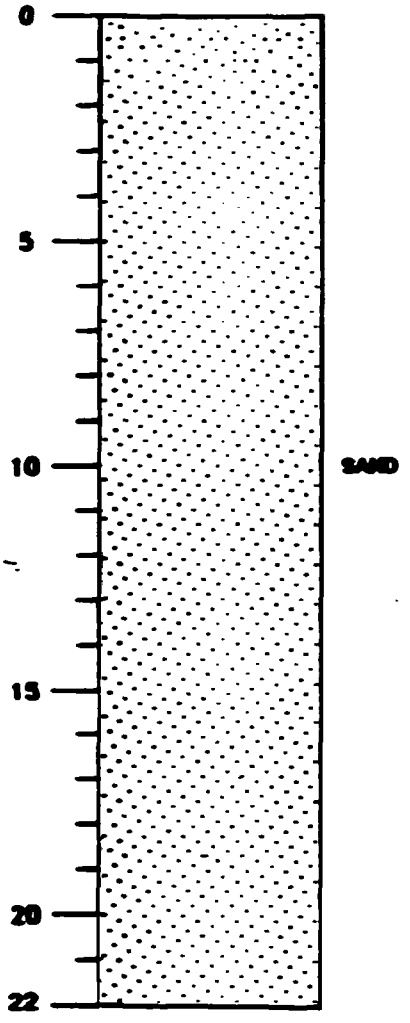
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	14/11/ 12/21	24	Top 12": Black soil and crushed limestone fill. Bottom: Dark yellowish brown coarse sand, little fine to medium sand, trace silt and fine gravel; dense; moist (SW).	OVA 2 ppm.
2	2.5 - 4.5	8/10/ 10/10	20	Yellowish brown coarse sand, little coarse to fine gravel, little fine to medium sand, trace silt; medium dense; moist to wet (SW).	OVA 0 ppm.
3	5 - 7	8/4/5/6	24	Same as above (SW).	Note: this yellowish brown sand could be water main backfill. Sample nos. 3 and 4 OVA 0 ppm. Sample no. 5 OVA 1 ppm.
4	7.5 - 9.5	6/4/5/4	20	Same as above, except loose (SW).	
5	10 - 12	4/8/12/16	20	Same as above, except grayish brown; medium dense; saturated (SW).	
6	12.5 - 14.5	10/10/ 19/22	20	Top 15": Same as above (SW). Bottom: Brown fine to medium sand, little coarse sand, trace fine gravel and silt; dense; saturated (SW).	OVA reading not taken.
7	15 - 17	18/24/ 31/42	20	Top 6": Dark brown coarse sand, little fine to medium sand and coarse to fine gravel; dense; saturated (SW). Bottom: Brown fine to medium sand, little coarse sand, trace silt and fine gravel; very dense; saturated (SW).	OVA 1/2 ppm.
8	17.5 - 19.5	6/28/ 35/71	20	Top 6": Same as above (SW). Bottom: Dark brown coarse sand, little coarse to fine gravel, trace fine to medium sand and silt; extremely dense; saturated (SW).	E.O.B. @ 19.5'. OVA reading not taken.

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Boring No. B36
Location N. side of ponds, 100' S. of of southernmost rail
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/04/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Diam. 8"
Boring Depth 22'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling 6'

Project Name Conrail site
Project Number ZF3000

Boring No. B36

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	2/4/6/12	24	Top 12": Dark brown sandy soil, coarse to fine sand; loose; moist. Bottom: Dark yellowish brown medium to coarse sand, some fine sand, trace silt and fine gravel; medium dense; moist (SW).	OVA 3 ppm in augers.
2	2.5 - 4.5	8/13/ 14/17	16	Top 6": Same as above (SW). Next 6": Dark brown clayey sand; wet; (SC). Bottom: Dark brown coarse sand, some silt and clay, trace coarse to fine gravel; dense; wet (SM-SC).	OVA 8 ppm.
3	5 - 7	15/34/ 50/70	6	Same as above with little coarse to fine gravel; saturated (SM-SC).	May have pushed a rock. OVA 60 ppm.
4	7.5 - 9.5	50/25/ 37/37	0	No recovery.	Probably pushed a cobble. OVA reading not taken.
5	10 - 12	11/26/ 26/22	16	Light yellowish brown coarse to fine sand, trace silt, little coarse to fine gravel; dense; saturated (SW).	OVA 30 ppm.
6	12.5 - 14.5	35/35/ 25/20	24	Same as above, except with some coarse to fine gravel; dense; saturated (SW-GW).	OVA 60 ppm.
7	15 - 17	11/22/ 25/27	20	Brown coarse sand and fine gravel, little fine to medium sand and coarse gravel; dense; saturated (SW-GW).	OVA 35 ppm.
8	17.5 - 19.5	6/16/ 21/24	24	Top 12": Same as above (SW-GW). Bottom: Brown fine to medium sand, little coarse sand, trace silt and fine gravel; dense; saturated (SW).	OVA <1 ppm.
9	20 - 22	4/6/12/31	24	Brown medium to coarse sand and fine gravel, coarsening downward with increasing gravel, little fine sand; dense; saturated (SW-GW).	E.O.B. @ 22'. OVA 0 ppm.

Project Name Conrail site
Project No. 2F3000

Date Prepared
Prepared by

Boring No. B37
Location W. yard, E. of B38
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/08/91
Type of Rig CME75

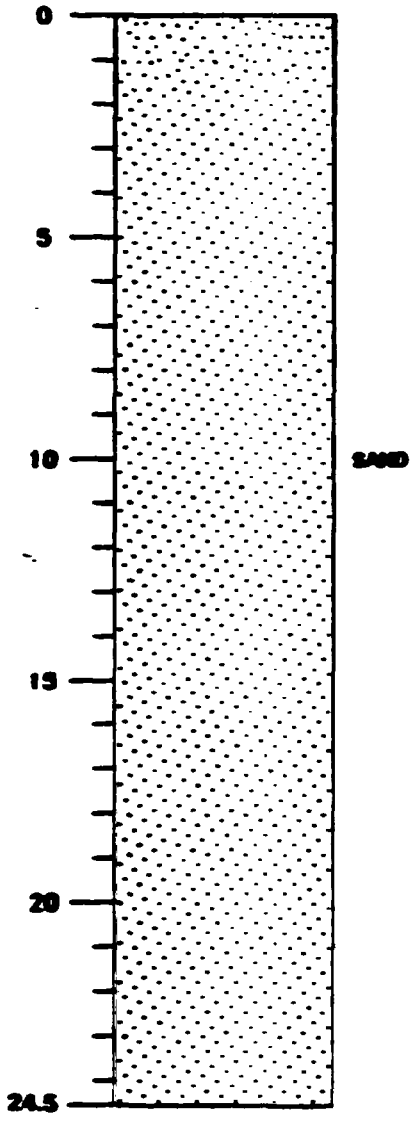
Method of Drilling Hollow stem auger

BORING DATA

Boring Diam. 8"
Boring Depth 24.5'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling 10'



Project Name Conrail site
Project Number ZF3000

Boring No. B37

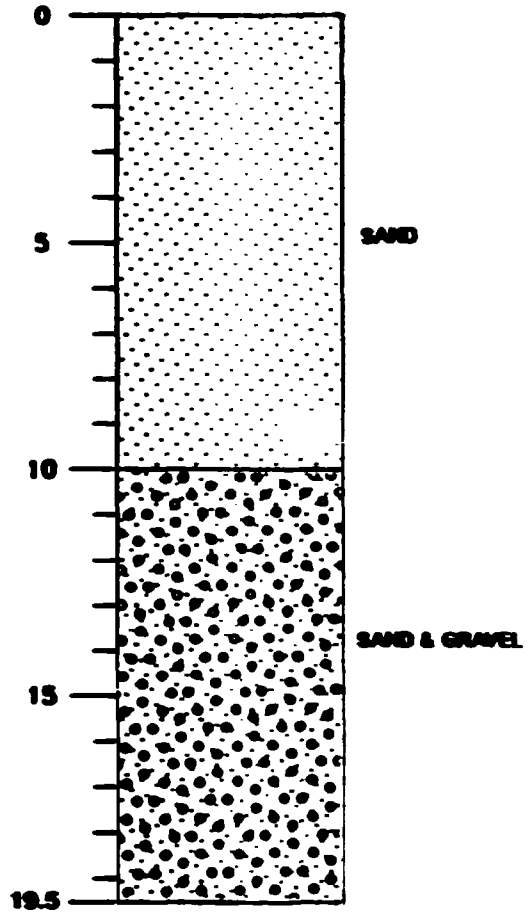
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	11/17/ 22/20	16	Top 6": Black soil and crushed gravel. Bottom: Dark yellowish brown fine to medium sand, trace coarse sand and fine gravel, trace silt; dense; moist (SP).	OVA <1 ppm.
2	2.5 - 4.5	11/7/7/6	18	Same as above, grading down to coarse to fine sand, some coarse to fine gravel at 4'; medium dense; moist to wet (SW).	OVA 0 ppm.
3	5 - 7	4/4/4/4	20	Same as above (SW).	OVA 0 ppm.
4	7.5 - 9.5	8/4/6/6	18	Top 6": Same as above (SW). Bottom: Dark yellowish brown coarse sand, some coarse to fine gravel, little fine to medium sand, trace silt, medium dense; moist to wet (SW-GW).	OVA 0 ppm.
5	10 - 12	5/6/7/11	20	Brown coarse sand and fine gravel, little medium sand, trace silt and coarse gravel; medium dense; saturated (SW-GW).	OVA 0 ppm.
6	12.5 - 14.5	9/14/ 13/16	16	Brown coarse sand, little fine gravel, trace fine to medium sand and coarse gravel; medium dense; saturated (SW).	OVA 0 ppm.
7	15 - 17	40/30/ 20/23	16	Same as above (SW).	OVA 4 ppm.
8	17.5 - 19.5	20/15/ 17/18	20	Brown coarse to fine sand, little coarse to fine gravel, trace silt; medium dense; saturated (SW).	OVA 20 ppm.
9	20 - 22	8/10/ 10/20	14	Brown coarse sand, little coarse to fine gravel, trace fine to medium sand; medium dense; saturated (SW).	OVA 5 ppm.
10	22.5 - 24.5	10/20/ 35/30	24	Same as above, some coarse to fine gravel; dense; saturated (SW-GW).	E.O.B. @ 24.5'. OVA 3 ppm.

Project Name Conrail site
Project No. 2F3000

Date Prepared
Prepared by

Boring No. B38
Location W. yard, S. of B28-B32
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Borgerson Caswell
Geologist C. Carlson
Start & Completion Date 10/08/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Diam. 8"
Boring Depth 19.5'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling 18'

Project Name Conrail site
Project Number ZF3000

Boring No. B38

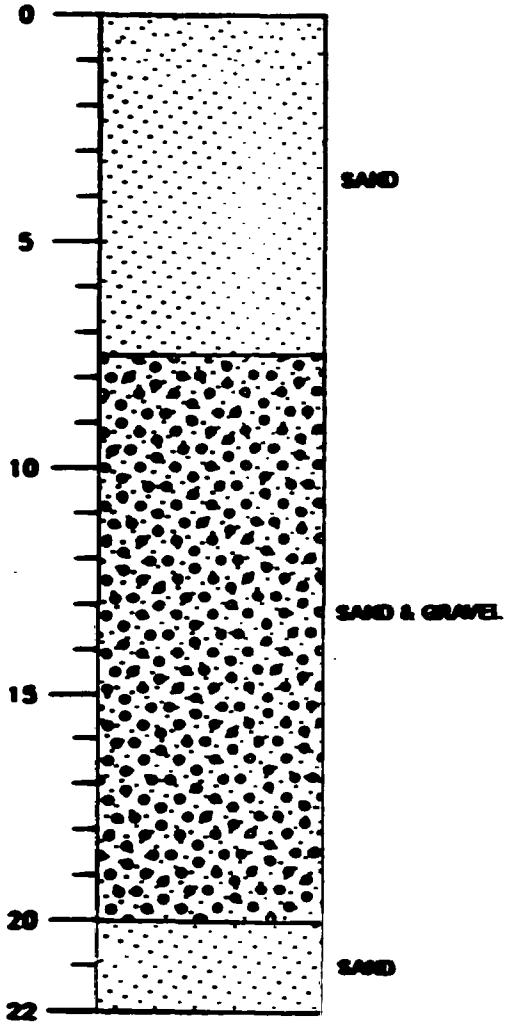
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	7/9/12/17	20	Top 8": Black soil and crushed gravel. Bottom: Dark yellowish brown fine to medium gravel; medium dense, moist (SW).	OVA 0 ppm.
2	2.5 - 4.5	9/7/8/7	16	Same as above (SW).	OVA 0 ppm.
3	5 - 7	4/3/5/3	18	Top 12": Same as above (SW). Bottom: Dark brown coarse sand, little coarse to fine gravel, some clay, trace fine to medium sand and silt; loose; moist (SW).	OVA 0 ppm.
4	7.5 - 9.5	4/3/3/5	18	Same as above (SW).	OVA 0 ppm.
5	10 - 12	4/7/9/8	19	Brown coarse to fine sand and fine gravel, trace coarse gravel; medium dense; saturated (SW-GW).	OVA 0 ppm.
6	12.5 - 14.5	13/15/ 15/15	20	Same as above (SW-GW).	OVA 0 ppm.
7	15 - 17	10/12/ 12/10	18	Same as above (SW-GW).	OVA 0 ppm.
8	17.5 - 19.5	13/17/ 19/20	18	Same as above (SW-GW).	E.O.B. @ 19.5'. OVA 1/2 ppm.

Project Name Conrail site
Project No. 1F3000

Date Prepared
Prepared by

Boring No. B39
Location W. yard, E. of B37
Owner U.S. EPA
Ground Elevation
Top of Inner Casing Elev. N/A
Drilling Firm Borgerson Caswell
Geologist C. Carlson
Start & Completion Date 10/08/91
Type of Rig CME75

Method of Drilling Hollow stem auger



BORING DATA

Boring Diam. 8"
Boring Depth 22'
Boring Abandonment:
Grout Enviroplug bentonite

TEST DATA

Depth to Water Level:
While Drilling 18'

Project Name Conrail site
Project Number ZF3000

Boring No. B39

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	0 - 2	4/7/7/16	20	Dark yellowish brown fine to medium sand, trace coarse sand, trace fine gravel; moist (SW).	Some crushed gravel mixed in at top. OVA 0 ppm.
2	2.5 - 4.5	15/8/7/8	16	Same as above (SW).	OVA 0 ppm.
3	5 - 7	7/9/5/5	15	Same as above (SW).	OVA 0 ppm.
4	7.5 - 9.5	10/12/ 13/16	24	Light yellowish brown medium to coarse sand and fine gravel, trace fine sand and coarse gravel; medium dense; moist (SW).	OVA 0 ppm.
5	10 - 12	8/7/8/9	24	*Same as above except brown; saturated (SW).*	OVA 0 ppm.
6	12.5 - 14.5	14/10/ 20/15	24	Same as above (SW).	OVA 0 ppm.
7	15 - 17	10/25/ 30/35	18	Same as above (SW).	Cobble in spoon. OVA 1/2 ppm.
8	17.5 - 19.5	100/80/ 75/90	4	Same as above (SW).	Large cobble in drive shoe. OVA 1/2 ppm.
9	20 - 22	9/17/ 23/26	20	Brown fine to medium sand, little coarse sand, trace silt and fine gravel; dense; saturated (SW).	E.O.B. @ 22'. OVA 3 ppm.

APPENDIX C

SUBSURFACE SOIL ANALYTICAL RESULTS

DATA QUALIFERS

FIELD PARAMETERS

**	Designates field parameters were not collected.

ORGANICS	DEFINITION	INTERPRETATION
J	Indicates an estimated value.	Compound value may be semi-quantitative.
D	Identifies all compounds in an analysis at a secondary dilution factor.	Alerts data user to a possible change in the CRQL.
P	This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for detected concentrations between the two GC columns. The lower of the two values is reported and flagged with a "p".	

INORGANICS

QUALIFERS	DEFINITION	INTERPRETATION
J	Is an estimated value because of a QC Protocol.	Value may be semi-quantitative.
B	Value is real, but above instrument DL and below CRDL.	Value may be quantitative or semi-quantitative.
E	Estimated or not reported due to interference.	Compound or element was not detected or value may be semi-quantitative.
N	Spike recoveries outside QC protocols which indicates a possible matrix problem data may be biased high or low.	Value may be quantitative or semi-quantitative.
W	Post digestion spike for furnance AA analysis is out of control limits (35-115%), while sample absorbance is <50% of spike absorbance.	Value may be semi-quantitative.

QUANTITATION LIMITS

Water Samples - to calculate sample quantitation limit: **(CRQL** x **dilution** factor).

Soil Samples - to calculate sample quantitation limit: **(CRQL** x **dilution** factor)/(100-% moisture)/100).

The listed quantitation limits for soil/sediments are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.

VOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils

Location	CRB20	CRB20	CRB20	CRB21	CRB21	CRB21	CRB22	CRB22dup	CRB22	CRB22
Sample Depth (feet)	5-6.5	7.5-9.5	10-12	2.5-4.5	5-7	10-12	2.5-4.5	2.5-4.5	5-7	10-12
Date Sampled	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91
VOLATILE ORGANICS(UG/KG)										
chloromethane										
bromomethane										
vinyl chloride										
chloroethane										
methylene chloride		11J	5J	5J	4J	4J	3J		2J	
acetone	1800	650	150	84	19	170	160	180	170	100
carbon disulfide										
1, 1-dichloroethene										
1, 1-dichloroethane										
1, 2-dichloroethene (total)										
chloroform										
1, 2-dichloroethane										
2-butanone (MEK)										
1, 1, 1-trichloroethane										
carbon tetrachlororide										
vinyl acetate										
bromodichloromethane										
1, 2-dichloropropane										
cis-1, 3-dichloropropene										
trichloroethene										
dibromochloromethane										
1, 1, 2-trichloroethane										
benzene										
trans-1, 3-dichloropropene										
bromoform										
4-methyl-2-pentanone										
2-hexanone										
tetrachloroethene										
toluene										25
1, 1, 2, 2-tetrachloroethane										
chlorobenzene										
ethylbenzene										
styrene										
xylenes (total)										

VOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils

Location	CRB23	CRB23	CRB23	CRB24	CRB24	CRB24	CRB25	CRB25	CRB25	CRB25dup
Sample Depth (feet)	2.5-4.5	5-7	10-12	5-7	20-22	22.5-24.5	5-7	20-22	23.5-25.5	23.5-25.5
Date Sampled	9/16/91	9/16/91	9/16/91	10/01/91	10/01/91	10/01/91	10/01/91	10/01/91	10/01/91	10/01/91
VOLATILE ORGANICS(UG/KG)										
chloromethane										
bromomethane										
vinyl chloride										
chloroethane										
methylene chloride	3J									
acetone	71	19	18						4700J	
carbon disulfide										
1, 1-dichloroethene										
1, 1-dichloroethane										
1, 2-dichloroethene (total)										
chloroform					2300	33000			1200J	13000J
1, 2-dichloroethane										
2-butanone (MEK)						6J				
1, 1, 1-trichloroethane										
carbon tetrachloride				1J	27000	30000	2J	8000	23000	30000J
vinyl acetate										
bromodichloromethane										
1, 2-dichloropropane										
cis-1, 3-dichloropropene										
trichloroethene				12		3J	12			7J
dibromochloromethane										
1, 1, 2-trichloroethane										
benzene										
trans-1, 3-dichloropropene										
bromoform										
4-methyl-2-pentanone			7J							
2-hexanone										
tetrachloroethene						1J	1J			
toluene		5J	16	7J		3J	7J			12
1, 1, 2, 2-tetrachloroethane										
chlorobenzene										
ethylbenzene										
styrene										
xylenes (total)										

VOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils

Location	CRB26	CRB26	CRB26	CRB27	CRB28	CRB28dup	CRB28	CRB28	CRB29	CRB32
Sample Depth (feet)	2.5-4.5	22.5-24.4	27-29	10-12	0-2	0-2	2.5-4.5	15-17	0-2	0-2
Date Sampled	10/01/91	10/01/91	10/01/91	10/03/91	10/03/91	10/03/91	10/03/91	10/03/91	10/03/91	10/03/91
VOLATILE ORGANICS(UG/KG)										
chloromethane										
bromomethane										
vinyl chloride										8J
chloroethane										
methylene chloride										
acetone										
carbon disulfide										
1, 1-dichloroethene										
1, 1-dichloroethane										
1, 2-dichloroethene (total)					110	9J	7J		100	5600D
chloroform										
1, 2-dichloroethane										
2-butanone (MEK)					13J			11J	17J	22J
1, 1, 1-trichloroethane										
carbon tetrachloride			2J							
vinyl acetate										
bromodichloromethane										
1, 2-dichloropropane										
cis-1, 3-dichloropropene										
trichloroethene	6J	8J	5J	15000D	13000D	240	6J	13	170	
dibromochloromethane										
1, 1, 2-trichloroethane						2J				
benzene										
trans-1, 3-dichloropropene										
bromoform										
4-methyl-2-pentanone										
2-hexanone										
tetrachloroethene	2J		2J	4J	3J	3J	4J	1J	2J	
toluene	6J	5J			5J					
1, 1, 2, 2-tetrachloroethane										
chlorobenzene										
ethylbenzene										
styrene										
xylenes (total)				2J	3J		2J	2J	2J	

VOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils

Location	CRB35	CRB35	CRB35	CRB36	CRB36	CRB36	CRB37	CRB37	CRB37	CRB38
Sample Depth (feet)	0-2	7.5-9.5	12.5-14.5	2.5-4.5	5-7	12.5-14.5	5-7	15-17	17.5-19.5	2.5-4.5
Date Sampled	10/04/91	10/04/91	10/04/91	10/04/91	10/04/91	10/04/91	10/08/91	10/08/91	10/08/91	10/08/91
VOLATILE ORGANICS(UG/KG)										
chloromethane										
bromomethane										
vinyl chloride										
chloroethane										
methylene chloride										
acetone										
carbon disulfide										
1, 1-dichloroethene										
1, 1-dichloroethane										
1, 2-dichloroethene (total)										
chloroform										
1, 2-dichloroethane										
2-butanone (MEK)			6J							
1, 1, 1-trichloroethane										
carbon tetrachloride										
vinyl acetate										
bromodichloromethane										
1, 2-dichloropropane										
cis-1, 3-dichloropropene										
trichloroethene	9J		1J					1J		
dibromochloromethane										
1, 1, 2-trichloroethane										
benzene										
trans-1, 3-dichloropropene										
bromoform										
4-methyl-2-pentanone										
2-hexanone										
tetrachloroethene	7J		1J							
toluene	38J	2J	4J	2J	6J	3J	1J	6J	1J	
1, 1, 2, 2-tetrachloroethane										
chlorobenzene										
ethylbenzene										
styrene										
xylenes (total)										

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VOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils

Location	CRB38	CRB38	CRB39	CRB39dup	CRB39	CRB39
Sample Depth (feet)	10-12	15-17	5-7	5-7	15-17	20-22
Date Sampled	10/08/91	10/08/91	10/08/91	10/08/91	10/08/91	10/08/91
VOLATILE ORGANICS(UG/KG)						
chloromethane						
bromomethane						
vinyl chloride						
chloroethane						
methylene chloride						
acetone		310D			800D	
carbon disulfide						
1, 1-dichloroethene						
1, 1-dichloroethane						
1, 2-dichloroethene (total)						
chloroform						
1, 2-dichloroethane						
2-butanone (MEK)						6J
1, 1, 1-trichloroethane						
carbon tetrachlororide						
vinyl acetate						
bromodichloromethane						
1, 2-dichloropropane						
cis-1, 3-dichloropropene						
trichloroethene		1J			1J	
dibromochloromethane						
1, 1, 2-trichloroethane						
benzene						
trans-1, 3-dichloropropene						
bromoform						
4-methyl-2-pentanone						
2-hexanone						
tetrachloroethene						
toluene		3J	7J	27	9J	19
1, 1, 2, 2-tetrachloroethane						
chlorobenzene						
ethylbenzene						
styrene						
xylenes (total)						

SEMIVOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils

Location	CRB20	CRB20	CRB20	CRB21	CRB21	CRB21	CRB22	CRB22dup	CRB22	CRB22
Sample Depth (feet)	5-6.5	7.5-9.5	10-12	2.5-4.5	5-7	10-12	2.5-4.5	2.5-4.5	5-7	10-12
Date Sampled	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91
SEMIVOLATILE ORGANICS(UG/KG)										
phenol										
bis(2-chloroethyl)ether										
2-chlorophenol										
1, 3-dichlorobenzene										
1, 4-dichlorobenzene										
benzyl alcohol										
1, 2-dichlorobenzene										
2-methylphenol										
bis(2-chloroisopropyl)ether										
4-methylphenol										
n-nitroso-di-n-dipropylamine										
hexachloroethane										
nitrobenzene										
isophorone										
2-nitrophenol										
2, 4-dimethylphenol										
benzoic acid										
bis(2-chloroethoxy)methane										
2, 4-dichlorophenol										
1, 2, 4-trichlorobenzene										
naphthalene	1800J	200J								
4-chloroaniline										
hexachlorobutadiene										
4-chloro-3-methylphenol										
2-methylnaphthalene	15000	3900								
hexachlorocyclopentadiene										
2, 4, 6-trichlorophenol										
2, 4, 5-trichlorophenol										
2-chloronaphthalene										
2-nitroaniline										
dimethylphthalate										
acenaphthylene										
2, 6-dinitrotoluene										
3-nitroaniline										
acenaphthene	3000J	780	61J							

SEMIVOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils

Location	CRB20	CRB20	CRB20	CRB21	CRB21	CRB21	CRB22	CRB22dup	CRB22	CRB22
Sample Depth (feet)	5-6.5	7.5-9.5	10-12	2.5-4.5	5-7	10-12	2.5-4.5	2.5-4.5	5-7	10-12
Date Sampled	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91	9/16/91
SEMIVOLATILE ORGANICS(UG/KG)										
2, 4-dinitrophenol										
4-nitrophenol										
dibenzofuran	1600J	420J								
2, 4-dinitrotoluene										
diethylphthalate										
4-chlorophenyl-phenylether										
fluorene	3000J	890	63J							
4-nitroaniline										
4, 6-dinitro-2-methylphenol										
n-nitrosodiphenylamine										
4-bromophenyl-phenylether										
hexachlorobenzene										
pentachlorophenol										
phenanthrene	3800	1200	110J							
anthracene	1400J	340J								
di-n-butylphthalate						22J				23J
fluoranthene	6600J	1500	130J							38J
pyrene	6800J	1600	130J							30J
butylbenzylphthalate										
3, 3'dichlorobenzidine										
benzo[a]anthracene	1200J	270J								
chrysene	1500J	300J								
bis(2-ethylhexyl)phthalate	2400J	170J	540	49J	71J	68J				
di-n-octylphthalate										
benzo[b]fluoranthene										59J
benzo[k]fluoranthene										
benzo[a]pyrene										
indeno[1, 2, 3-cd]pyrene										
dibenzo[a, h]anthracene										
benzo[g, h, i]perylene										

SEMIVOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils (cont.)

Location	CRB23	CRB23	CRB23	CRB24	CRB24	CRB24	CRB25	CRB25	CRB25	CRB25dup
Sample Depth (feet)	2.5-4.5	5-7	10-12	5-7	20-22	22.5-24.5	5-7	20-22	23.5-25.5	23.5-25.5
Date Sampled	9/16/91	9/16/91	9/16/91	10/01/91	10/01/91	10/01/91	10/01/91	10/01/91	10/01/91	10/01/91
SEMIVOLATILE ORGANICS(UG/KG)										
phenol										
bis(2-chloroethyl)ether										
2-chlorophenol										
1,3-dichlorobenzene										
1,4-dichlorobenzene										
benzyl alcohol										
1,2-dichlorobenzene										
2-methylphenol										
bis(2-chloroisopropyl)ether										
4-methylphenol										
n-nitroso-di-n-dipropylamine										
hexachloroethane						55J				
nitrobenzene										
isophorone										
2-nitrophenol										
2,4-dimethylphenol										
benzoic acid										
bis(2-chloroethoxy)methane										
2,4-dichlorophenol										
1,2,4-trichlorobenzene										
naphthalene										
4-chloroaniline										
hexachlorobutadiene										
4-chloro-3-methylphenol										
2-methylnaphthalene										
hexachlorocyclopentadiene										
2,4,6-trichlorophenol										
2,4,5-trichlorophenol										
2-chloronaphthalene										
2-nitroaniline										
dimethylphthalate										
acenaphthylene										
2,6-dinitrotoluene										
3-nitroaniline										
acenaphthene										

SEMIVOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils (cont..)

Location	CRB23	CRB23	CRB23	CRB24	CRB24	CRB24	CRB25	CRB25	CRB25	CRB25dup
Sample Depth (feet)	2.5-4.5	5-7	10-12	5-7	20-22	22.5-24.5	5-7	20-22	23.5-25.5	23.5-25.5
Date Sampled	9/16/91	9/16/91	9/16/91	10/01/91	10/01/91	10/01/91	10/01/91	10/01/91	10/01/91	10/01/91
SEMIVOLATILE ORGANICS(UG/KG)										
2, 4-dinitrophenol										
4-nitrophenol										
dibenzofuran										
2, 4-dinitrotoluene										
diethylphthalate										
4-chlorophenyl-phenylether										
fluorene										
4-nitroaniline										
4, 6-dinitro-2-methylphenol										
n-nitrosodiphenylamine										
4-bromophenyl-phenylether										
hexachlorobenzene										
pentachlorophenol										
phenanthrene				83J						
anthracene										
di-n-butylphthalate										
fluoranthene				240J						
pyrene				230J						
butylbenzylphthalate										
3, 3'dichlorobenzidine										
benzo[a]anthracene				130J						
chrysene				170J						
bis(2-ethylhexyl)phthalate										
di-n-octylphthalate										
benzo[b]fluoranthene				150J						
benzo[k]fluoranthene				140J						
benzo[a]pyrene				100J						
indeno[1, 2, 3-cd]pyrene										
dibenzo[a, h]anthracene										
benzo[g, h, i]perylene										

SEMIVOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils (cont..)

Location	CRB26	CRB26	CRB26	CRB27*	CRB28	CRB28dup	CRB28	CRB28	CRB29	CRB32
Sample Depth (feet)	2.5-4.5	22.5-24.5	27-29	10-12	0-2	0-2	2.5-4.5	15-17	0-2	0-2
Date Sampled	10/01/91	10/01/91	10/01/91	10/03/91	10/03/91	10/03/91	10/03/91	10/03/91	10/03/91	10/03/91
SEMIVOLATILE ORGANICS(UG/KG)										
phenol										
bis(2-chloroethyl)ether										
2-chlorophenol										
1,3-dichlorobenzene										
1,4-dichlorobenzene										
benzyl alcohol										
1,2-dichlorobenzene										
2-methylphenol										
bis(2-chloroisopropyl)ether										
4-methylphenol										
n-nitroso-di-n-dipropylamine										
hexachloroethane										
nitrobenzene										
isophorone										
2-nitrophenol										
2,4-dimethylphenol										
benzoic acid										
bis(2-chloroethoxy)methane										
2,4-dichlorophenol										
1,2,4-trichlorobenzene										
naphthalene										
4-chloroaniline										
hexachlorobutadiene										
4-chloro-3-methylphenol										
2-methylnaphthalene										
hexachlorocyclopentadiene										
2,4,6-trichlorophenol										
2,4,5-trichlorophenol										
2-chloronaphthalene										
2-nitroaniline										
dimethylphthalate										
acenaphthylene										
2,6-dinitrotoluene										
3-nitroaniline										
acenaphthene										

SEMIVOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings – Subsurface Soils (cont...)

Location	CRB26	CRB26	CRB26	CRB27*	CRB28	CRB28dup	CRB28	CRB28	CRB29	CRB32
Sample Depth (feet)	2.5–4.5	22.5–24.5	27–29	10–12	0–2	0–2	2.5–4.5	15–17	0–2	0–2
Date Sampled	10/01/91	10/01/91	10/01/91	10/03/91	10/03/91	10/03/91	10/03/91	10/03/91	10/03/91	10/03/91
SEMIVOLATILE ORGANICS(UG/KG)										
2, 4–dinitrophenol										
4–nitrophenol										
dibenzofuran										
2, 4–dinitrotoluene										
diethylphthalate										
4–chlorophenyl–phenylether										
fluorene										
4–nitroaniline										
4, 6–dinitro–2–methylphenol										
n–nitrosodiphenylamine										
4–bromophenyl–phenylether										
hexachlorobenzene										
pentachlorophenol										
phenanthrene										220J
anthracene										
di–n–butylphthalate										
fluoranthene						73J	59J			710J
pyrene					39J	110J	77J			570J
butylbenzylphthalate										
3, 3'dichlorobenzidine										
benzo[a]anthracene										510J
chrysene						41J	47J			400J
bis(2–ethylhexyl)phthalate										
di–n–octylphthalate										
benzo[b]fluoranthene						38J	41J			480J
benzo[k]fluoranthene										410J
benzo[a]pyrene										530J
indeno[1, 2, 3–cd]pyrene										390J
dibenzo[a, h]anthracene										
benzo[g, h, i]perylene										260J

SEMIVOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils (cont...)

Location	CRB35*	CRB35	CRB35	CRB36*	CRB36*	CRB36*	CRB37	CRB37	CRB37	CRB38
Sample Depth (feet)	0-2	7.5-9.5	12.5-14.5	2.5-4.5	5-7	12.5-14.5	5-7	15-17	17.5-19.5	2.4-4.5
Date Sampled	10/04/91	10/04/91	10/04/91	10/04/91	10/04/91	10/04/91	10/08/91	10/08/91	10/08/91	10/08/91
SEMIVOLATILE ORGANICS(UG/KG)										
phenol										
bis(2-chloroethyl)ether										
2-chlorophenol										
1,3-dichlorobenzene										
1,4-dichlorobenzene										
benzyl alcohol										
1,2-dichlorobenzene										
2-methylphenol										
bis(2-chloroisopropyl)ether										
4-methylphenol										
n-nitroso-di-n-dipropylamine										
hexachloroethane										
nitrobenzene										
isophorone										
2-nitrophenol										
2,4-dimethylphenol										
benzoic acid										
bis(2-chloroethoxy)methane										
2,4-dichlorophenol										
1,2,4-trichlorobenzene										
naphthalene										
4-chloroaniline										
hexachlorobutadiene										
4-chloro-3-methylphenol										
2-methylnaphthalene										
hexachlorocyclopentadiene										
2,4,6-trichlorophenol										
2,4,5-trichlorophenol										
2-chloronaphthalene										
2-nitroaniline										
dimethylphthalate										
acenaphthylene										
2,6-dinitrotoluene										
3-nitroaniline										
acenaphthene										

SEMIVOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings – Subsurface Soils (cont...)

Location	CRB35*	CRB35	CRB35	CRB36*	CRB36*	CRB36*	CRB37	CRB37	CRB37	CRB38
Sample Depth (feet)	0-2	7.5-9.5	12.5-14.5	2.5-4.5	5-7	12.5-14.5	5-7	15-17	17.5-19.5	2.4-4.5
Date Sampled	10/04/91	10/04/91	10/04/91	10/04/91	10/04/91	10/04/91	10/08/91	10/08/91	10/08/91	10/08/91
SEMIVOLATILE ORGANICS(UG/KG)										
2, 4-dinitrophenol										
4-nitrophenol										
dibenzofuran										
2, 4-dinitrotoluene										
diethylphthalate										
4-chlorophenyl-phenylether										
fluorene										
4-nitroaniline										
4, 6-dinitro-2-methylphenol										
n-nitrosodiphenylamine										
4-bromophenyl-phenylether										
hexachlorobenzene										
pentachlorophenol										
phenanthrene										
anthracene										
di-n-butylphthalate										
fluoranthene										
pyrene										
butylbenzylphthalate										
3, 3'dichlorobenzidine										
benzo[a]anthracene										
chrysene										
bis(2-ethylhexyl)phthalate										
di-n-octylphthalate										
benzo[b]fluoranthene										
benzo[k]fluoranthene										
benzo[a]pyrene										
indeno[1, 2, 3-cd]pyrene										
dibenzo[a, h]anthracene										
benzo[g, h, i]perylene										

SEMIVOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils (cont.)

Location	CRB38	CRB38	CRB39	CRB39dup	CRB39	CRB39
Sample Depth (feet)	10-12	15-17	5-7	5-7	15-17	20-22
Date Sampled	10/08/91	10/08/91	10/08/91	10/08/91	10/08/91	10/08/91
SEMIVOLATILE ORGANICS(UG/KG)						
phenol						
bis(2-chloroethyl)ether						
2-chlorophenol						
1, 3-dichlorobenzene						
1, 4-dichlorobenzene						
benzyl alcohol						
1, 2-dichlorobenzene						
2-methylphenol						
bis(2-chloroisopropyl)ether						
4-methylphenol						
n-nitroso-di-n-dipropylamine						
hexachloroethane						
nitrobenzene						
isophorone						
2-nitrophenol						
2, 4-dimethylphenol						
benzoic acid						
bis(2-chloroethoxy)methane						
2, 4-dichlorophenol						
1, 2, 4-trichlorobenzene						
naphthalene						
4-chloroaniline						
hexachlorobutadiene						
4-chloro-3-methylphenol						
2-methylnaphthalene						
hexachlorocyclopentadiene						
2, 4, 6-trichlorophenol						
2, 4, 5-trichlorophenol						
2-chloronaphthalene						
2-nitroaniline						
dimethylphthalate						
acenaphthylene						
2, 6-dinitrotolunene						
3-nitroaniline						
acenaphthene						

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SEMIVOLATILE ORGANIC COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils (cont...)

Location	CRB38	CRB38	CRB39	CRB39dup	CRB39	CRB39
Sample Depth (feet)	10-12	15-17	5-7	5-7	15-17	20-22
Date Sampled	10/08/91	10/08/91	10/08/91	10/08/91	10/08/91	10/08/91
SEMIVOLATILE ORGANICS(UG/KG)						
2, 4-dinitrophenol						
4-nitrophenol						
dibenzofuran						
2, 4-dinitrotoluene						
diethylphthalate						
4-chlorophenyl-phenylether						
fluorene						
4-nitroaniline						
4, 6-dinitro-2-methylphenol						
n-nitrosodiphenylamine						
4-bromophenyl-phenylether						
hexachlorobenzene						
pentachlorophenol						
phenanthrene						
anthracene						
di-n-butylphthalate				56J		
fluoranthene						
pyrene						
butylbenzylphthalate						
3, 3'dichlorobenzidine						
benzo[a]anthracene						
chrysene						
bis(2-ethylhexyl)phthalate			57J			
di-n-octylphthalate						
benzo[b]fluoranthene			71J			
benzo[k]fluoranthene						
benzo[a]pyrene			61J			
indeno[1, 2, 3-cd]pyrene						
dibenzo[a, h]anthracene						
benzo[g, h, i]perylene						

PESTICIDES/PCBs COMPOUND ANALYTICAL RESULTS
Soil Borings - Subsurface Soils

Location	CRB22	CRB22dup	CRB26	CRB28	CRB36
Sample Depth (feet)	7.5-9.5	7.5-9.5	22.5-24.4	15-17	12.5-14.5
Date Sampled	9/16/91	9/16/91	10/01/91	10/03/91	10/04/91
PESTICIDES/PCBs(UG/KG)					
alpha BHC					
beta BHC					
delta BHC					
gamma BHC (lindane)					
Heptachlor					
Aldrin					
Heptachlor epoxide					
Endosulfan I					
Dieldrin	0.68J	2.9JP			
4,4'-DDE					
Endrin	1.8PJ	4.4P			
Endosulfan II					
4,4'-DDD					
Endosulfan sulfate	1.5J	1.9JP			
4,4'-DDT					
Methoxychlor (Marlate)	4.9JP	5.4JP			
Endrin aldehyde	3.1J				
Endrin ketone					
alpha Chlordane					
gamma Chlordane		0.71JP			
Toxaphene					
Aroclor 1016					
Aroclor 1221					
Aroclor 1232					
Aroclor 1242					
Aroclor 1248					
Aroclor 1254					
Aroclor 1260	65PJ	260			

TOTAL METAL ANALYTE ANALYTICAL RESULTS
Soil Borings - Subsurface Soils

Location	CRB22	CRB22dup	CRB26	CRB28	CRB36
Sample Depth (feet)	7.5-10.5	7.5-10.5	22.5-24.5	15-17	12.5-14.5
Date Sampled	9/17/91	9/17/91	10/01/91	10/03/91	10/04/91
TOTAL METALS(MG/KG)					
aluminum	5560J	3360J	4780JE	1970JE	2040JE
antimony					
arsenic	3.3	1.5B	4.1	1.8B	2.3
barium	35.8B	13.8B	15.9BJE	5.8BJE	15.4BJE
beryllium					
cadmium	3.2	1.3	2.6	1.2	1.7
calcium	1470JE	1060JE	98200JE	66700JE	67600JE
chromium	18.7J	7.3J	13.7	6.3	6.7
cobalt	5.1B	2.9B	4B	2B	3.3B
copper	11.9	6.5J	9	4.6B	8.2
iron	12300J	6610J	10200JE	4910JE	6720JE
lead	6.9JN	3.8JN	4	2.3	2.9
magnesium	1950	1140	20800	10100	12500
manganese	702J	114J	206JEN	159JEN	197JEN
mercury					
nickel	15.8	7B	12.7	4.4B	7.1B
potassium	1020B	519B	477B	269B	267B
selenium					
silver					
sodium	179BJ	146BJ	169BJ	120BJ	131BJ
thallium			0.27BJ	0.32BJ	
vanadium	14.2	10.2B	8.9B	3.5B	4.6B
zinc	34.3J	21.1J	32.7	19.2	22

TOTAL ORGANIC CARBON ANALYTICAL RESULTS
Soil Borings - Subsurface Soils

Location	CRB22	CRB22dup	CRB26	CRB28	CRB36
Sample Depth (feet)	7.5-9.5	7.5-9.5	22.5-24.5	15-17	12.5-14.5
Date Sampled	9/17/91	9/17/91	10/01/91	10/03/91	10/04/91
TOTAL ORGANIC CARBON	0.21 J	0.38 J	1.31 J	1.79 J	2.58 J

APPENDIX D

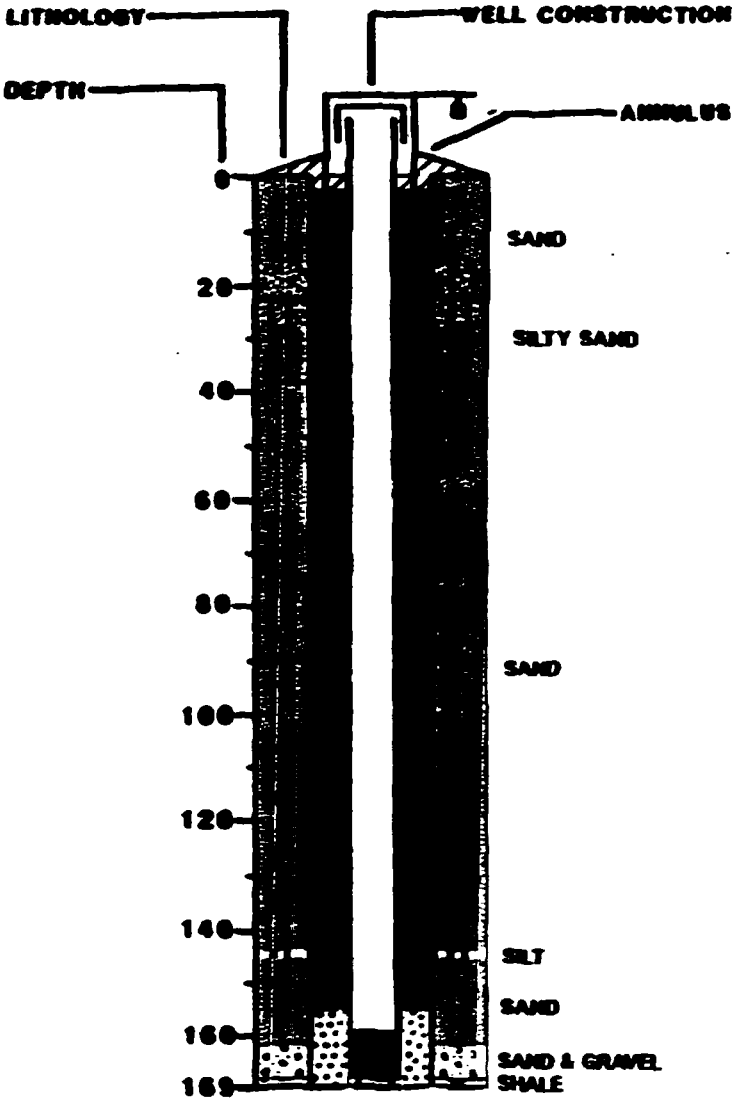
GEOLOGIC MONITORING WELL BORING LOGS

Project Name Conrail site
Project No. 2F3000

Date Prepared
Prepared by

Well No. MW02BR
Location 54041 Southgate
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 742.53'
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Dates 10/19 & 10/20/91
Type of Rig Gus Pech

Method of Drilling Mud rotary



WELL DATA

Boring Diam. 8"
Boring Depth 169'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 158.9'-168.9'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 155.5'-168.9'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 12.3'
After Drilling 14.7' (10/28/91)
After Completion 13.91' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

7460:1

558047

Project Name Conrail site
Project Number ZF3060

Well No. MW02BR Page 1 of 2

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	5 - 6.5	3-5-6	ND	Medium dense medium brown medium sand. Bottom 6 inches medium dense medium brown coarse sand, and small gravel (SP).	MW02BR was drilled from 0'-133' without sampling; this part of the log is from Conrail Phase 1 drilling, pilot boring PB02 drilled to 131.5'.
2A	10 - 10.5	9-8-13	ND	Medium dense medium brown coarse sand, trace medium gravel (SP).	
2B	10.5 - 11	ND	ND	Medium dense medium brown medium sand (SP).	
2C	11 - 11.5	ND	ND	Medium dense medium brown coarse sand (SP-SW).	
3	15 - 16.5	3-1-1	ND	Very loose brown very fine to fine sand (SP-SW).	
4	20 - 21.5	27-31-35	ND	Very dense medium golden brown sand, and medium to large gravel (SW).	
5	25 - 26.5	41-43-40	ND	Extremely dense medium deep golden brown silty sand, and medium to large gravel (SM).	
6	30 - 31.5	41-53-87	ND	Extremely dense light brown very fine silty sand, trace clay, rust areas throughout (SM).	
7	35 - 36.5	21-73-90	ND	Extremely dense light brown silty very fine sand, grading into a light brown fine to medium sand at 36 feet (SM).	
8	40 - 41.5	36-72-95	ND	Extremely dense light brown fine to medium sand, trace silt (SP).	
9	45 - 46.5	25-50-60	ND	Extremely dense brown to golden brown fine to medium sand, trace silt (SW).	
10	50 - 51.5	25-37-47	ND	Same as above (SW).	
11	55 - 56.5	28-35-49	ND	Extremely dense medium to dark brown very fine to medium sand, trace silt, trace large sand (SM).	
12	60 - 60.5	25-18-80	ND	Extremely dense brown medium to coarse sand, trace small gravel, trace silt (SW).	
13	65 - 66.5	41-45-39	ND	Extremely dense medium brown to golden brown coarse sand, trace to little small gravel (SW).	
14	70 - 71.5	33-49-41	ND	Same as above (SW).	
15	75 - 76.5	45-37-75	ND	Extremely dense grayish-brown very fine to coarse sand, some small grayish brown gravel (SW).	
16	80 - 81.5	45-69-47		No recovery, same as above (SW).	
17A	85 - 86.5	47-52-70	ND	Extremely dense grayish brown coarse sand, some medium to large gravel (SP).	
17B	86 - 86.5	ND	ND	Extremely dense fine to medium sand, trace small gravel (SP).	

7660:1

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A-110

Project Name Conrail site
Project Number CF3000

Well No. MW02BR (Cont.) Page 2 of 2

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
18	90 - 91.5	50-75-89	ND	Same as above (SP).	
19	95 - 96.5	41-71-79	ND	Extremely dense brown to golden brown fine to medium sand, trace silt (SW).	
20	100 - 101.5	54-90-107	ND	Extremely dense brown to golden brown medium to coarse sand, trace small gravel, trace silt (SW).	
21	105 - 106.5	49-58-56	ND	Same as above (SW).	
22	110 - 111.5	38-48-60	ND	Extremely dense brown to golden brown fine to medium sand (SW).	
23	115 - 116.5	74-76-67	ND	Extremely dense very coarse sand, and small to medium gravel, trace silt (SW).	
24	120 - 121.5	89-98	ND	Same as above but with medium to large gravel (SW).	
25	125 - 126.5	67-90	ND	Extremely dense medium to dark brown fine to coarse sand, trace large gravel (SW).	
26	130 - 131.5	52-60-81	ND	Same as above.	PB02 ends here E.O.B. 131.5'
SS1	135 - 137	12/22/ 46/71	16	Brown coarse sand, some medium sand and coarse to fine gravel, little fine sand, trace silt and cobbles; extremely dense; saturated (SW-GW).	MW02BR sampling begins here 10/20/91
SS2	138 - 140	12/18/ 30/41	10	Light brown coarse sand and coarse to fine gravel, little medium sand, trace fine sand; very dense; saturated (SP-GW).	Numerous angular limestone fragments in spoon.
SS3	143 - 145	12/12/ 24/27	18	Top 6": Dark gray silty fine sand; loose; saturated (SM) Middle 4": Very dark grayish brown silty clay to clayey silt; wet to saturated (ML-CL). Bottom: Brownish yellow coarse to fine sand and coarse to fine gravel, trace silt; medium dense; saturated (SW-GW).	
SS4	148 - 150	9/30/ 37/71	18	Pale brown coarse to fine sand, trace silt; very dense; saturated (SW).	
SS5	153 - 155	8/12/ 29/48	16	Pale brown fine to medium sand, little to trace silt; very dense; saturated (SP).	
SS6	158 - 160	12/29/ 52/54	24	Same as above with some coarse sand; extremely dense; saturated (SW)	
SS7	163 - 165	12/20 21/22	20	Brown coarse to fine sand and coarse to fine gravel, trace silt; dense; saturated (SW-GW).	
SS8	168 - 170	30/32 40/51	18	Top 12": same as above with some soft shale layers. Bottom: Competent bluish gray shale.	E.O.B. @169' N.D. = no data

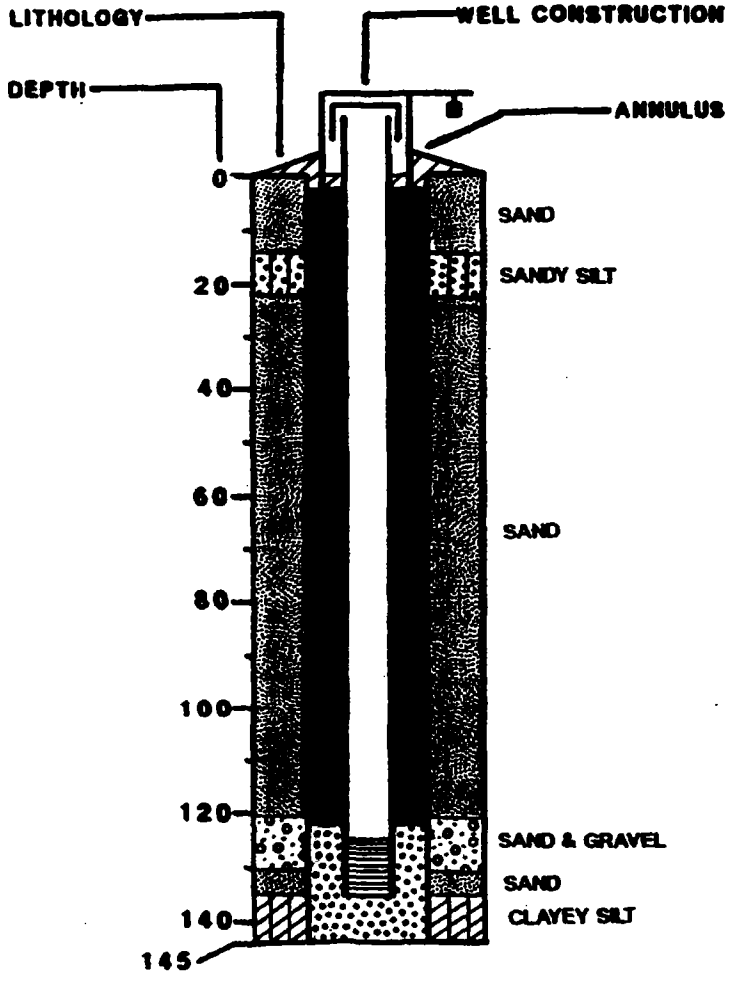
660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW08BR
Location South side Vistula Road
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 734.79'
Drilling Firm Bergerson Caswell
Geologist L. Lueck
Start & Completion Dates 10/30 & 10/31/91
Type of Rig Gus Fech

Method of Drilling Mud rotary



WELL DATA

Boring Diam. 8"
Boring Depth 145'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 126'-136'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 123'-136'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 13.2'
After Drilling 15.7' (11/03/91)
After Completion 16.04' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

7660:1

558047

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Project Name Conrail site
Project Number 2F3000

Well No. MW08BR Page 1 of 2

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
1	5 - 6.5	4-3-5	3	Loose brown medium to coarse sand and small to large gravel, angular to well-rounded (gravel very well-rounded), moist (SW).	MW08BR was drilled from 0'-83' without sampling; this part of the log is from Conrail Phase 1 drilling, MW08S to 36.5' and MW08D to 81.5'.
2	10 - 11.5	17-21-19	14	Dense light brown medium to coarse sand and small gravel, subrounded to well-rounded, moist (SP-SW).	
3	15 - 16.5	19-35-55	16	Very dense brown sandy silt, some small to medium gravel, trace clay, moist (SM-ML).	
4	20 - 21.5	44-59-83	18	Very dense brown sandy silt, some small to medium gravel, wet (SM-ML).	
5	25 - 26.5	63-50/2"	8	Very dense fine to medium sand, trace small gravel, subangular to subrounded, saturated (SW).	
6	30 - 31.5	47-50/5"	9	Very dense tan silty very fine sand, saturated (SM).	
7	35 - 36.5	48-50/5"	0	No recovery.	MW08S ends here E.O.B. @ 36.5'
01	35 - 36.5	37-46-52	6	Extremely dense brown fine to medium sand, subangular to subrounded, wet (SP).	MW08D sampling begins here. Solid stem augered 0'-6', blind drilled to 25', then mud rotary drilled to 81.5'.
02	40 - 41.5	52-55-50	6	Extremely dense grayish brown medium sand, subangular to subrounded, saturated (SP).	
03	45 - 46.5	100/5"	0	No recovery (refusal).	
04	50 - 51.5	104-50/3"	0	No recovery (refusal).	
05	55 - 56.5	90-106	0	No recovery (refusal).	
06	60 - 61.5	85-130-200	0	No recovery (refusal).	
07	65 - 66.5	140-68/3"	0	No recovery (refusal).	
08	70 - 71.5	42-73	10	Extremely dense grayish brown fine to medium sand, subangular to subrounded, saturated (SP).	
09	75 - 76.5	100/3"	0	No recovery.	
10	80 - 81.5	82-50/3"	0	Extremely dense grayish brown medium to coarse sand, subangular to well-rounded, saturated (SP).	MW08D ends here E.O.B. @ 81.5'.
SS1	83 - 85	27/38/40/41	13	Medium brown fine sand, trace clay, grading down to fine to medium sand; extremely dense; saturated (SP).	MW08BR sampling begins here 10/30/91
SS2	88 - 90	25/26/27/30	17	Brown fine to medium sand, trace fine to medium gravel; very dense; saturated (SP).	

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Project Name Conrail site
Project Number ZF3000

Boring Well No. MW08BR (Cont.) Page 2 of 2

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS3	90 - 95	18/17 16/21	14	Brown fine to coarse sand; dense; saturated (SP).	
SS4	85 - 100	17/34/ 54/53	19	Brown fine to medium sand, trace coarse sand; extremely dense; saturated (SP).	
SS5	103 - 105	43/56/ 61/61	19	Dark brown fine to coarse sand, trace fine to medium gravel; extremely dense; saturated (SW).	
SS6	108 - 110	57/64 84/88	17	Brown fine to coarse sand, little fine to medium gravel, grading down to fine to coarse sand, some fine to medium gravel; extremely dense; saturated (SW).	Bottom 3" of sample had a clayey rind but none inside.
SS7	113 - 115	14/14/ 100=9"	7	Medium brown fine to coarse sand, little fine to coarse gravel, trace clay, a little loose gravel on top; extremely dense (SW).	Very rough drilling and fragments of large gravel and small cobbles in spoon.
SS8	118 - 120	20/21/ 57/51	19	Brown fine to coarse sand, little fine to medium gravel; extremely dense; saturated (SW).	
SS9	123 - 125	23/54/ 63/61	15	Brown coarse sand and fine to coarse gravel, grading down to fine to medium sand, trace fine gravel; extremely dense; saturated (SW).	
SS10	128 - 130	16/39/ 42/73	13	Medium brown fine to coarse sand and fine to coarse gravel, trace silt; extremely dense; saturated (SW).	
SS11	133 - 135	14/28/ 41/50	15	Grayish brown medium to coarse sand, trace gravel, trace silt, grading down to yellowish brown gravel, little silt; extremely dense; saturated (SW-GW).	A few small gray clay lumps in cuttings below 135' - drilling sort of rough anyway. Hit clay around 136' according to driller.
SS12	138 - 140	15/50/ 113- refusal	0; 9	Dark gray clayey silt; extremely dense; moist (ML).	Sampler empty after first 18" attempt, traces of clay on outside; blows not counted on second attempt.
SS13	143 - 145	17/18/ 28/49	16	Dark gray clayey silt and silty clay; extremely dense; moist (ML-CH).	E.O.B. @ 145'; backfilled with sand to 136' to set screen.

7660:1

.oject Name Conrail site
roject Number ZF3000

Well No. NW2TS

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	5/7/5/7	22	Top 6": Dark brown sandy soil Bottom: Yellowish brown fine to medium sand, trace coarse sand and silt; medium dense; moist (SP).	
SS2	8 - 10	3/4/3/4	14	Top 6": Same as above (SP). Bottom: Dark brown coarse to fine sand, little silt, trace fine gravel: loose; saturated (SW).	
SS3	13 - 15	12/17/15/18	14	Same as above except brown, with little coarse to fine gravel: medium dense; saturated (SW).	
SS4	18 - 20	16/8/11/20	16	Yellowish brown fine to medium sand, little silt, little coarse to fine gravel concentrated in 1"-3" zones mixed with sand; medium dense; saturated (SW).	S.O.R. @ 20'

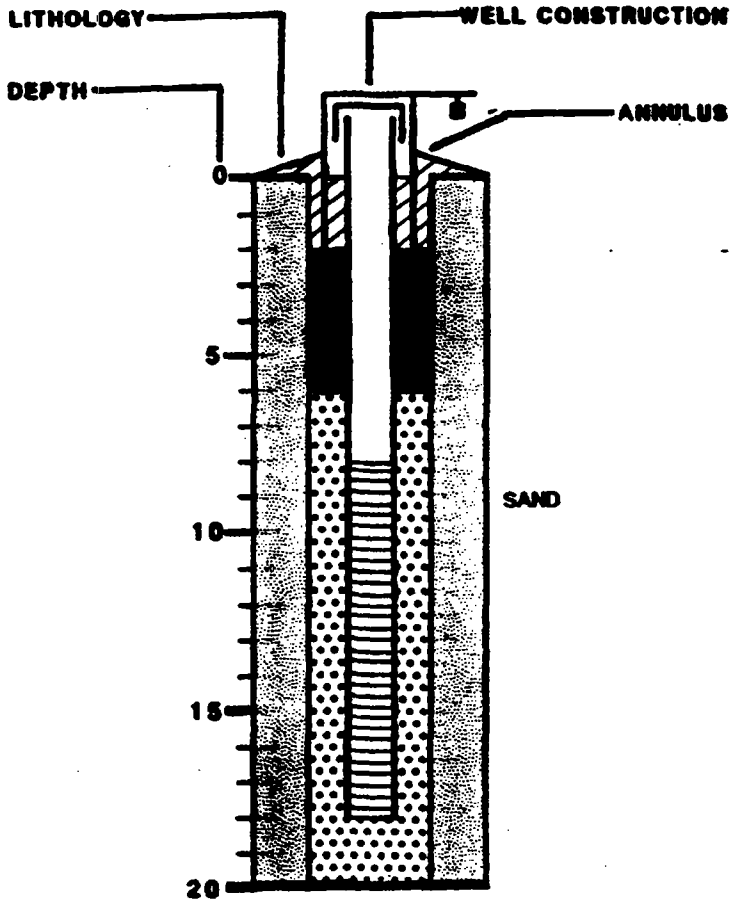
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW27S
Location S. of ponds, E. end of W. pond
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 751.87'
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/05/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 20'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 8'-18'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 6'-18'
Seal bentonite chips 5.5'-6'
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 9'
After Drilling 11.2' (10/29/91)
After Completion 10.73' (12/02/91)

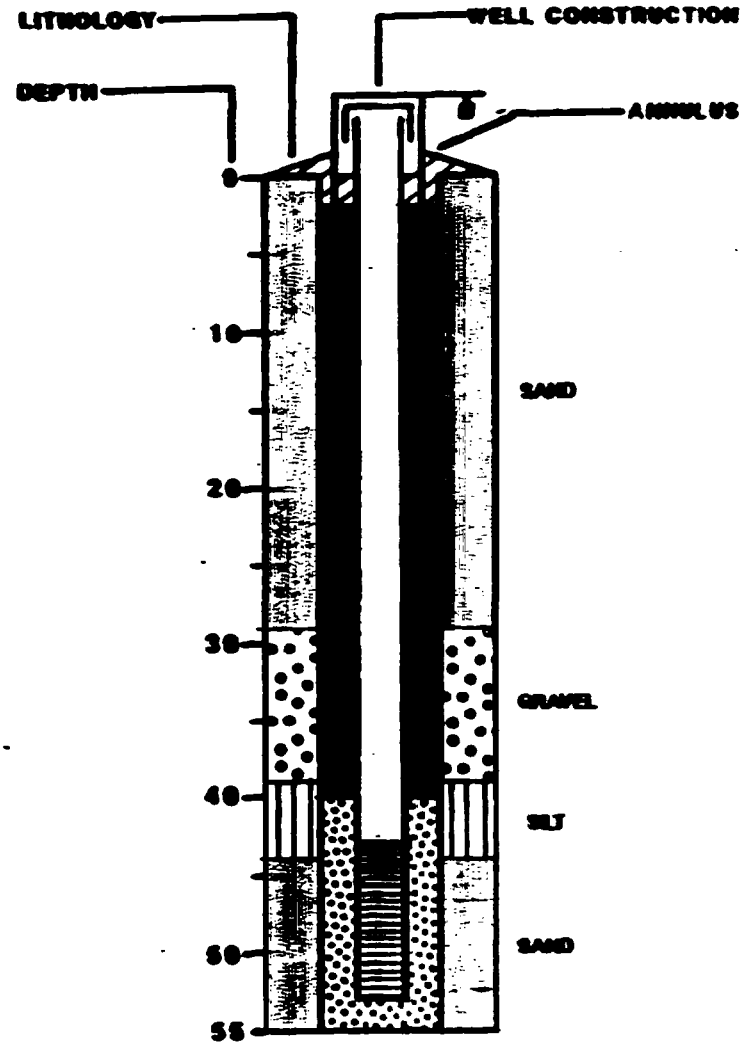
Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW27I
Location 5' south of MW27S
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev.
Drilling Firm Bergerson Caswell
Geologist B. Hackler
Start & Completion Dates 10/14 & 10/17/91
Type of Rig CME75/Gus Pech

Method of Drilling Hollow stem auger for sampling/mud rotary for well construction



WELL DATA

Boring Diam. 8"
Boring Depth 56'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 43.1'-53.1'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
  Filter Pack Silica sand 40.0'-53.1'
  Seal N/A
  Grout Enviroplug bentonite
  Lock No. 2344

TEST DATA

Depth to Water Level:
  While Drilling 10.8'
  After Drilling 11.6' (10/29/91)
  After Completion 11.52' (12/02/91)

Hydraulic Conductivity:
  Test Method
  Results
  Comments

Project Name Conrail site
Project Number ZP3000

Well No. MW27I

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	5/7/5/7	22	Top 6": Dark brown sandy soil. Bottom: Yellowish brown fine to medium sand, trace coarse sand and silt: medium dense: moist (SP).	MW27I was drilled from 0'-23' without sampling: this part of the log is from MW27S.
SS2	8 - 10	3/4/3/4	14	Top 6": Same as above (SP). Bottom: Dark brown coarse to fine sand, little silt, trace fine gravel: loose: saturated (SW).	
SS3	13 - 15	12/17/ 15/18	14	Same as above except brown with little coarse to fine gravel: medium dense: saturated (SW).	
SS4	18 - 20	16/8/ 11/20	16	Yellowish brown fine to medium sand, little silt, little coarse to fine gravel concentrated in 1"-3" zones mixed with sand: medium dense: saturated (SW).	MW27S ends here E.O.B. @ 20'
SS1	23 - 25	11/19/ 4/13	22	Brown medium sand with some fine and coarse sand: medium dense: saturated (SW).	MW27I sampling begins here 11/14/91
SS2	28 - 30	10/12/ 16/20	22	Top 12": Same as above (SW). Bottom: Yellowish brown medium to coarse gravel, little sand, trace silt: dense: saturated (GW).	
SS3	33 - 35	25/30/ 30/35	2	Same as above except possibly some cobbles as well: very dense (GW).	Large piece of basalt in spoon: difficult drilling, like cobbles
SS4	38 - 40	10/14/ 25/28	21	Top 12": Same as above (GW). Bottom: Dark grayish brown silt, trace clay, sand, fine gravel: dense: low plasticity: moist (ML).	
SS5	43 - 45	12/30/ 34/50	22	Top 9": Same as above (ML). Bottom: Gray fine sand, little fine gravel: extremely dense: wet (SP).	Removed 1' of heave before sampling.
SS6	48 - 50	25/75/90/ refusal after 50		Same as above except fine to medium sand: extremely dense: saturated (SW)	
SS7	53 - 55	3/3/8/30	24	Grayish brown medium to coarse sand: 1" thick silt stringer in middle: dense: saturated (SP). Note: This boring was drilled twice with hollow stem auger on 10/14/91: sampling and soil description was done during the first of these. Severe sand heave in the auger prevented well construction in either, they were abandoned and grouted to ground surface. A third boring was completed with mud rotary drilling on 10/17/91, and the monitoring well was constructed in this hole about 5' south of MW27S.	

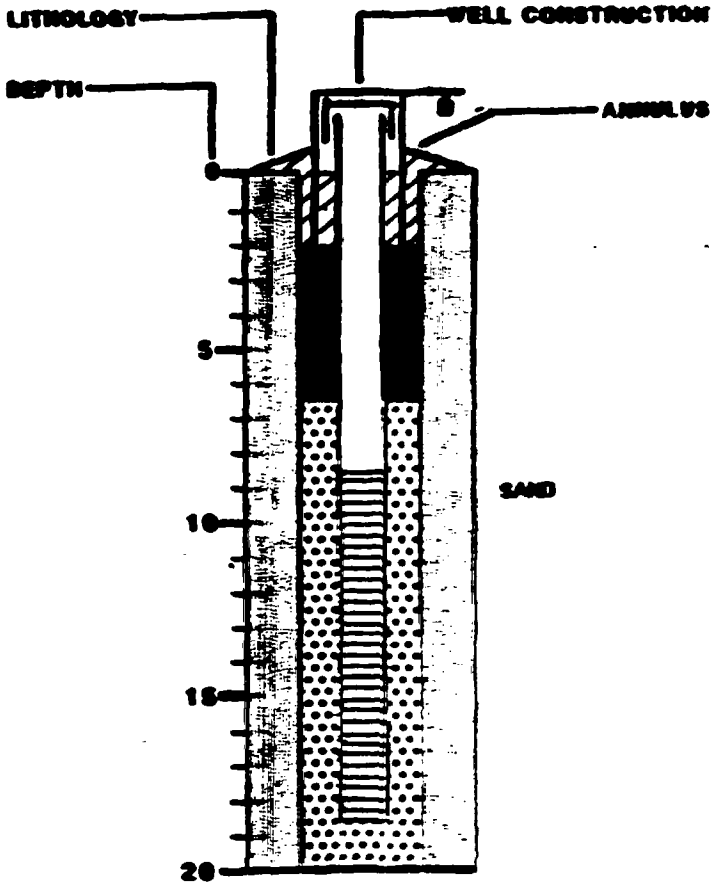
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW20S
Location East of ponds along access road
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 758.83'
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/05/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 20'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 8.5'-18.5'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 4.5'-18.5'
Seal Bentonite chips 4.0'-4.5'
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 9.8'
After Drilling 12.2' (10/29/91)
After Completion 11.34' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

7660:1

550047

recycled paper

ecology and environment

0184

Project Name Conrail site
Project Number ZF3000

Well No. MW28S

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	4/5/4/4	14	Dark yellowish brown fine to medium sand, little coarse sand, trace silt and coarse to fine gravel; loose; moist (SW).	
SS2	8 - 10	5/5/7/7	13	Brown medium to coarse sand, little fine sand and fine gravel, trace silt; medium dense; saturated at shoe, moist above (SW).	
SS3	13 - 15	13/21/ 17/11	6	Same as above except little coarse to fine gravel; medium dense; saturated (SW).	
SS4	18 - 20	7/6/ 10/9	6	Brown coarse sand and fine gravel, trace fine to medium sand and coarse gravel, trace silt; medium dense; saturated (SW-GW). E.O.B. @ 20' (drilled to 19')	Cobble in spoon.

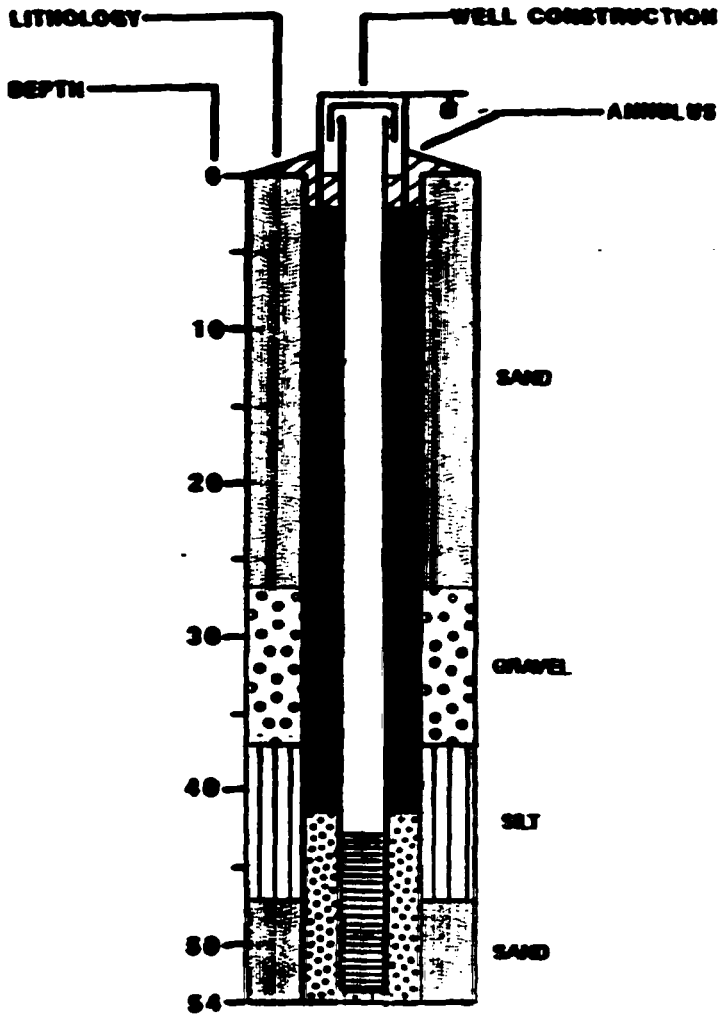
7660:1

Project Name Conrail site
Project No. IF3000

Date Prepared
Prepared by

Well No. MW28I
Location 4' west of MW28S
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 750.91'
Drilling Firm Bergerson Caswell
Geologist R. Hackler
Start & Completion Date 10/18/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 55'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 43'-53'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 41'-53'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 7.8'
After Drilling 11.6' (10/29/91)
After Completion 11.69' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZP3000

Well No. MW28I

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	4/5/4/4	14	Dark yellowish brown fine to medium sand, little coarse sand, trace silt and coarse to fine gravel; loose; moist (SW).	MW28I was drilled from 0'-23' without sampling; this part of the log is from MW28S.
SS2	8 - 10	5/5/7/7	13	Brown medium to coarse sand; little fine sand and fine gravel, trace silt; medium dense; saturated at shoe, moist above (SW).	
SS3	13 - 15	13/21/ 17/11	6	Same as above except little coarse to fine gravel; medium dense; saturated (SW).	
SS4	18 - 20	7/6/ 10/9	6	Brown coarse sand and fine gravel, trace fine to medium sand and coarse gravel, trace silt; medium dense; saturated (SW-GW).	MW2S ends here. E.O.B. @ 20'
SS1	23 - 25	7/13/ 15/17	12	Brown medium to very coarse sand, some fine gravel, trace fine sand and silt; dense; saturated (SW).	MW28I sampling begins here 10/18/91.
SS2	28 - 30	7/15/ 20/22	12	Brown gravel, some coarse to very coarse sand, trace fine sand, silt; dense; saturated (GW).	
SS3	33 - 35	12/ refusal	8	Same as above (GW).	Tough drilling at 32'. Drilling change at 37'.
SS4	38 - 40	10/38/ 43/45	12	Dark brown and dark grayish brown silt; little very coarse sand; extremely dense; low plasticity; wet (ML).	
SS5	43 - 45	5/20/ 20/30	15	Dark gray silt, little very coarse sand; extremely dense; low plasticity; wet (ML).	Drilling change at 47'.
SS6	48 - 50	5/28/ 35/45	24	Top 18": Grayish brown fine to coarse sand, trace silt; saturated (SW). Bottom: Yellowish brown very fine to fine sand; very dense; wet (SP).	
SS7	53 - 55	6/12/ 15/18	24	Grayish brown medium to coarse sand, little very coarse sand, little fine sand; gray silt stringer at 54'; dense; saturated (SW).	E.O.B. @ 55'

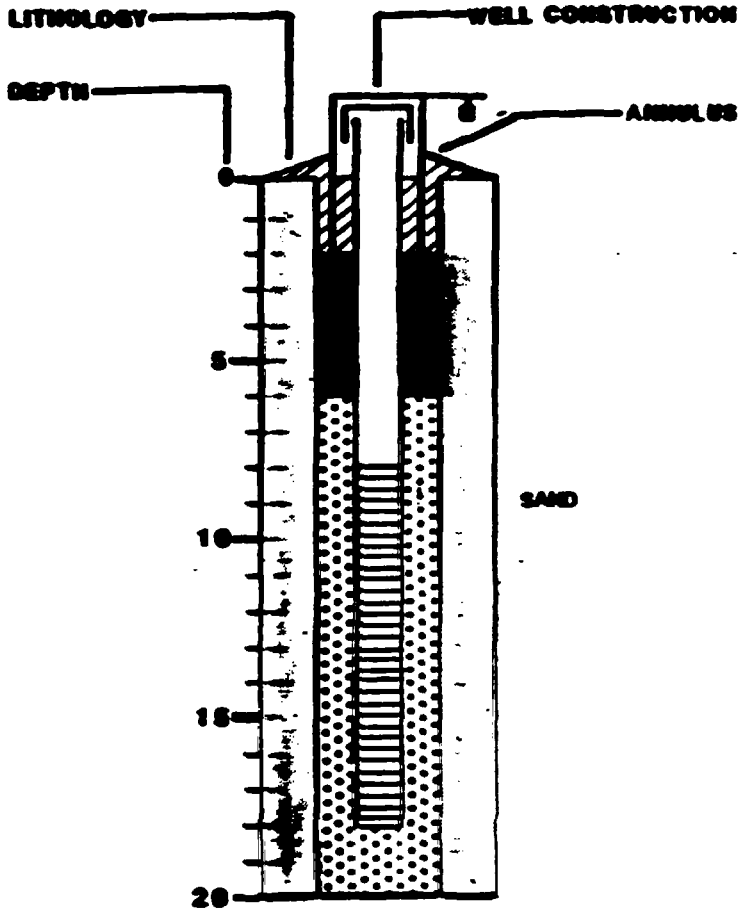
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW29S
Location South end of eastern pond
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 751.77'
Drilling Firm Borgerson Caswell
Geologist C. Carlson
Start & Completion Date 10/05/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 20'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 8'-18'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 6'-18'
Seal Bentonite pellets 5.5'-6'
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 9.5'
After Drilling 10.3' (11/01/91)
After Completion 10.54' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number 2F3000

Well No. MW29S

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	3/4/4/5	12	Yellowish brown fine to medium sand, trace coarse sand; loose; moist (SP).	
SS2	8 - 10	3/6/5/5	14.5	Brown coarse to fine sand, little fine gravel, trace silt and coarse gravel; loose; wet (saturated at drive shoe) (SW).	
SS3	13 - 15	3/8/10/10	12	Same as above (SW).	
SS4	18 - 20	3/10/ 17/20	8	Same as above (SW).	E.O.B. @ 20'

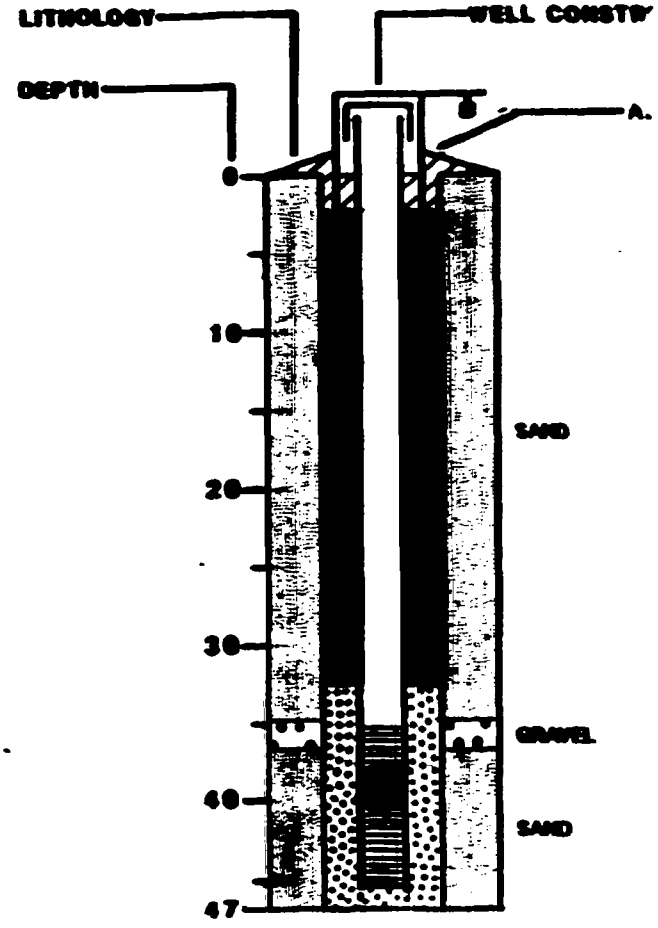
7660:1

Project Name Conrail site
Project No. ZP3000

Date Prepared
Prepared by

Well No. MW29I
Location South end of eastern pond
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 752.37'
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/09/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 50'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 35.3'-45.3'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 32.5'-47'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 10.0'
After Drilling 11.2' (11/01/91)
After Completion 11.17' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZF3000

Well No. MW29I

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	3/4/4/5	12	Yellowish brown fine to medium sand, trace coarse sand; loose; moist (SP).	MW29I was drilled from 0'-23' without sampling; this part of the log is from MW29S.
SS2	8 - 10	3/6/5/5	N.D.	Brown coarse to fine sand, little fine gravel, trace silt and coarse gravel; loose; wet (saturated at drive shoe) (SW).	
SS3	13 - 15	3/8/10/10	12	Same as above (SW).	
SS4	18 - 20	3/10/ 17/20	8	Same as above (SW).	MW29S ends here. E.O.B. @ 20'
SS1	23 - 25	8/11/ 2/13	24	Yellowish brown medium to coarse sand, little fine sand, trace silt and fine gravel; medium dense; saturated (SW).	MW29I sampling begins here 10/9/91
SS2	28 - 30	3/3/8/20	22	Same as above except brown (SW).	
SS3	33 - 35	3/3/3/4	16	Top half: Same as above (SW). Bottom half: Brown coarse to fine gravel, little fine sand, trace fine to medium sand; loose; saturated (GW).	Difficult drilling at about 36'.
SS4	38 - 40	45/55/ 60/60	20	Top 5": Brown coarse to fine sand, trace fine gravel, trace silt; very dense; saturated (SW). Middle 3": Brown clayey silt, trace fine sand; very dense; moist to dry (ML). Bottom: Brown coarse to fine sand, little fine gravel, trace silt, clay, and coarse gravel; dense; saturated (SW).	
SS5	43 - 45	15/13 20/31	14	Brown silty fine sand, trace medium sand and clay; dense; wet to saturated (SM).	
SS6	48 - 50	20/32/ 40/53	24	Same as above except wet to moist; grading downward to fine sandy silt (SM-ML).	E.O.B. @ 50'
		N.D. = no data			

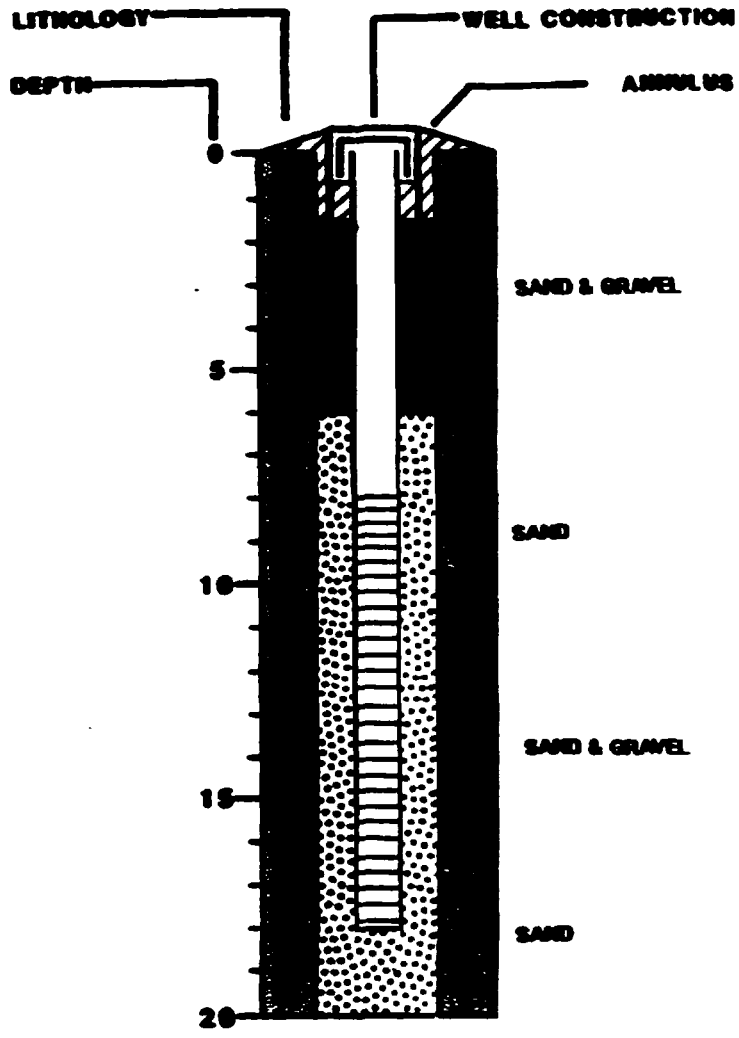
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. SW30S
Location West end of classification yard between tracks 39 and 40
Owner U.S. ETA
Ground Elevation No data
Top of Inner Casing Elev. 748.13'
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/06/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 20'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 8'-18'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 6'-18'
Seal Bentonite pellets 5.5'-6'
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 9.4'
After Drilling 9.4' (10/31/91)
After Completion 8.43' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZF3000

Well No. MW30S

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
				Drilled to 20' for well construction without sampling (except one split spoon for grain size analysis at 11'-13'). See log MW30I for stratigraphy at this location.	E.O.B. @ 20'.

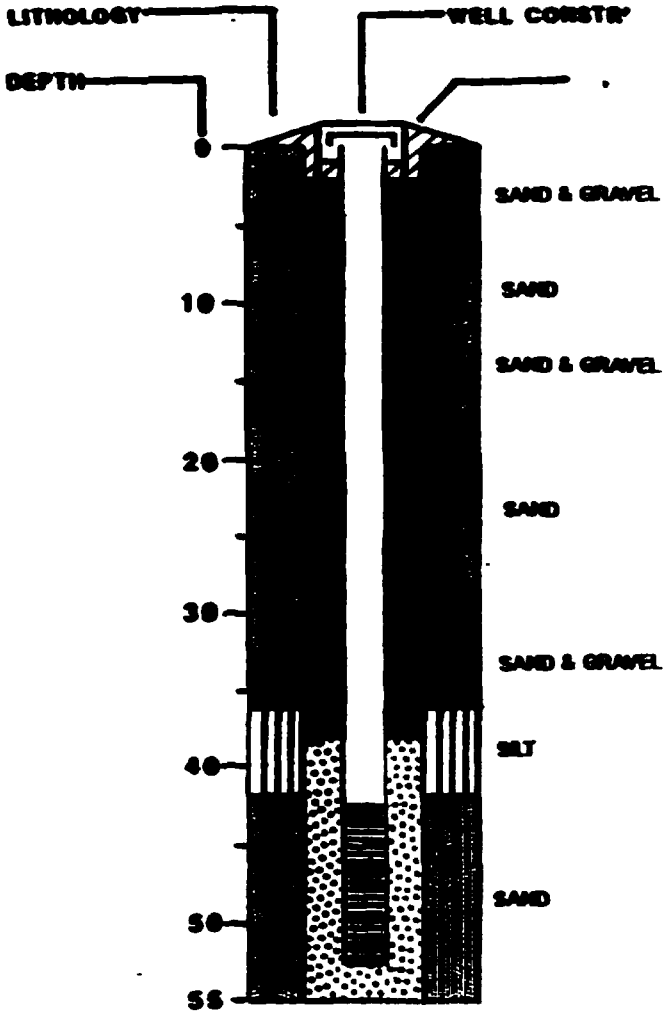
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. SB30I
Location West end of classification yard between tracks 39 and 40
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 748.18'
Drilling Firm Borgerson Caswell
Geologist C. Carlson
Start & Completion Date 10/06/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 55'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 42.7'-52.7'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 38'-55'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 10.5'
After Drilling 9.1' (10/31/91)
After Completion 9.35' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number 2F3000

Well No. MW30I

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	6/4/3/3	6	Yellowish brown clayey sand and gravel, little silt; loose; moist.	Appears to be fill material.
SS2	8 - 10	12/8/ 10/18	10	Brown coarse sand, little fine gravel and clay, trace fine to medium sand and coarse gravel; medium dense; wet (SP).	
SS3	13 - 15	27/10/ 7/8	14	Yellowish brown coarse sand and fine gravel, some silt and clay, trace fine to medium sand and coarse gravel; medium dense; saturated (SM-GM).	
SS4	18 - 20	3/5/ 27/50	20	Brown medium to coarse sand, some coarse to fine gravel, little fine sand, trace silt, trace small cobbles; very dense; saturated (SW).	
SS5	23 - 25	13/15/ 8/12	22	Same as above except medium dense (SW).	
SS6	28 - 30	9/12/ 19/29	20	Top 3": Same as above (SW). Middle 9": Pale brown silty clay to clayey silt, trace fine sand, trace coarse to fine gravel; very dense; moist (ML-CL). Bottom: Brown fine to medium sand, trace coarse sand, trace silt; dense; saturated (SW).	
SS7	33 - 35	1/2/ 10/23	18	Brown coarse sand and fine gravel, trace silt and clay, trace fine sand and coarse gravel; dense; saturated (SP-GP).	
SS8	38 - 40	14/40 42/60	18	Pale brown clayey silt to sandy silt, trace coarse to fine sand and fine gravel; extremely dense; moist to wet (ML-CL).	Drilling change at 42'.
SS9	43 - 45	25/125/ 175/200	18	Pale brown fine sand, little coarse sand and coarse to fine gravel at top, little silt; extremely dense; saturated (SP).	
SS10	48 - 50	4/6/ 40/40	24	Brown silty medium sand, little coarse sand, little fine sand, trace fine gravel; very dense; saturated (SP).	
SS11	53 - 55	18/34/ 42/40	18	Pale brown fine to medium sand, little silt, trace coarse sand and fine gravel; very dense; saturated (SP).	E.O.B. @ 55'

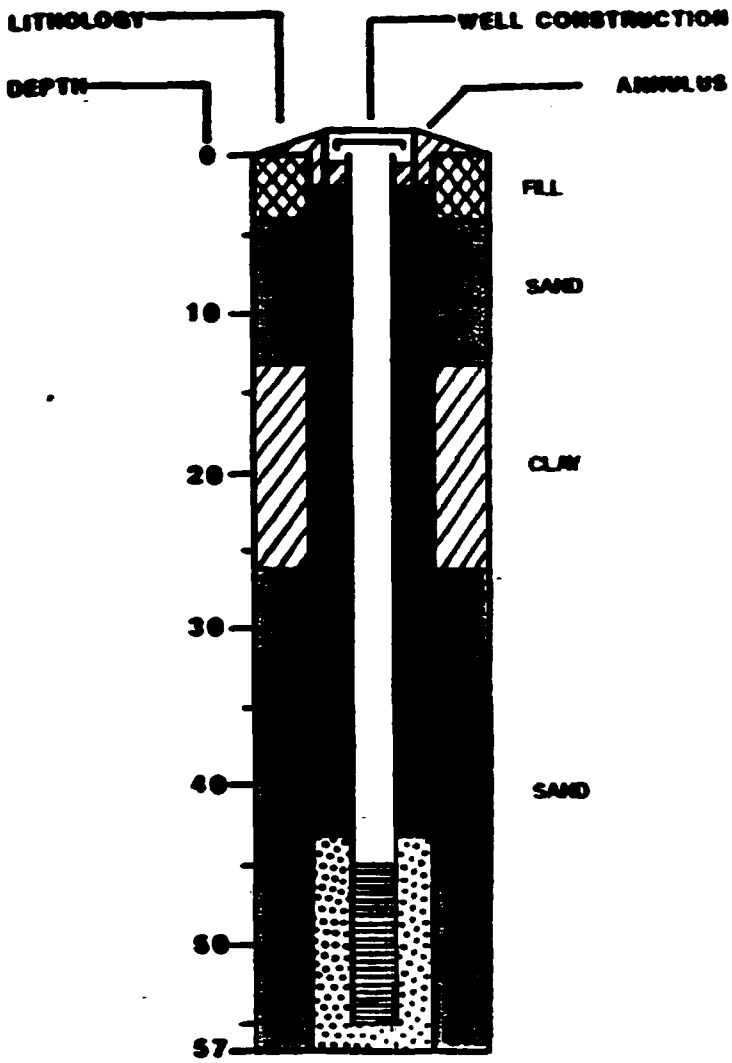
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW36I
Location Between track groups 3 and 4
900' west of bend
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 747.84'
Drilling Firm Bergerson Caswell
Geologist B. Hackler
Start & Completion Date 10/21/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 9"
Boring Depth 57'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 45'-55'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 43'-57'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 8'
After Drilling 7.5' (10/30/91)
After Completion 7.74' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZF3000

Well No. MW36I

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	7/8/7/10	20	Top 12": Black soil & ballast. Bottom: Grayish brown fine to coarse sand, little very coarse sand; medium dense; moist (SW).	
SS2	8 - 10	7/7/8/17	16	Grayish brown medium to very coarse sand, some gravel; medium dense; saturated (SW).	
SS3	13 - 15	3/3/4/9	22	Top 6": Same as above (SW). Bottom: Dark gray clay, little silt; medium dense; high plasticity; wet (CL).	
SS4	18 - 20	3/3/4/6	18	Same as above (CL).	
SS5	23 - 25	5/5/5/6	22	Same as above (CL).	
SS6	28 - 30	10/12/ 10/11	24	Dark gray very fine sand, some silt, some very coarse sand and gravel, little clay; medium dense; saturated to wet (SM).	
SS7	33 - 35	2/2/3/5	22	Same as above (SM).	
SS8	38 - 40	2/3/3/3	17	Same as above (SM).	
SS9	43 - 45	12/28/ 40/50	24	Top 6": Same as above (SM). Bottom: Brown fine to medium sand, little coarse to very coarse sand; extremely dense; saturated (SW).	
SS10	48 - 50	10/22/ 30/40	24	Same as above except no coarse to very coarse sand and little very fine sand (SP).	
SS11	53 - 55	23/60/ 60/60	24	Same as above except with 2" gray clay stringer at 54.5' (SP).	E.O.B. @ 57'

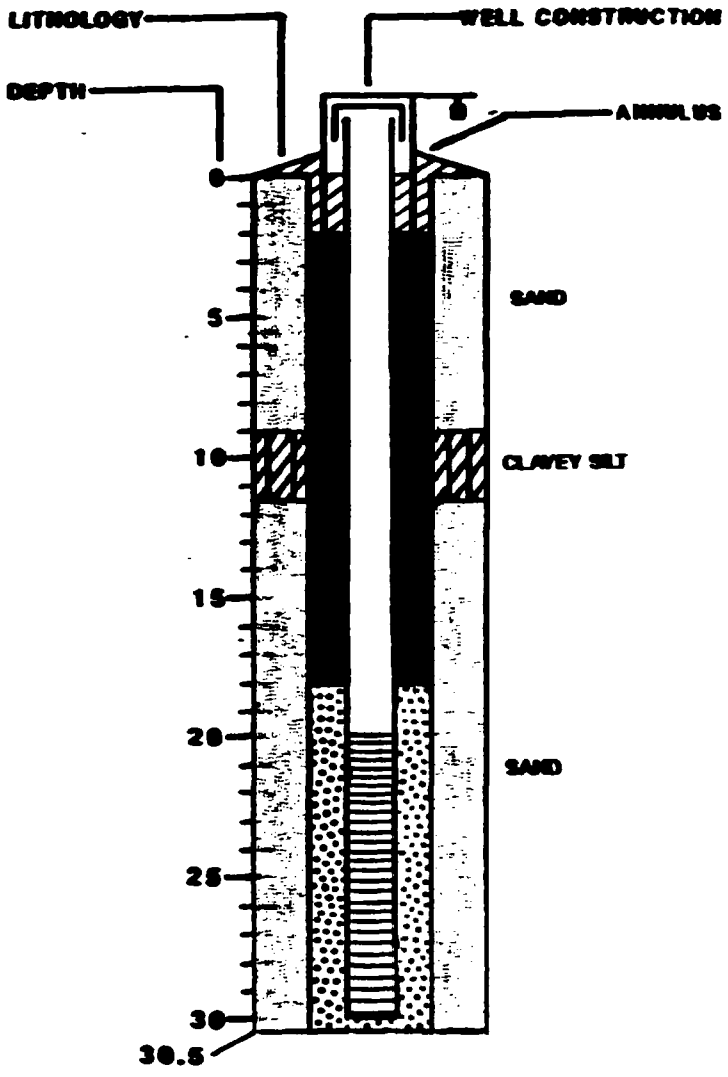
7660:1

Project Name Conrail site
Project No. CF3000

Date Prepared
Prepared by

Well No. MW35S
Location Near LSA24
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 748.50'
Drilling Firm Bergerson Caswell
Geologist E. Heckler
Start & Completion Date 10/10/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 30.5'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 20'-30'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 18'-30'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 6.5'
After Drilling 7.3' (11/01/91)
After Completion 7.33' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

7660:1

558047

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ecology and environment

0198

Project Name Conrail site
Project Number 2F3000

Well No. MW35S

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	4/9/11/13	18	Pale brown fine to medium sand, some very fine sand; medium dense; moist (SW).	
SS2	8 - 10	9/6/5/8	22	Top 13": Same as above except saturated (SW). Bottom: Yellowish brown clayey silt; wet (ML).	
SS3	13 - 15	3/3/2/4	24	Brown fine to medium sand, little coarse sand, trace gravel; loose; saturated (SW).	
SS4	18 - 20	4/4/6/9	24	Top 6": Same as above (SW). Bottom: Yellowish brown coarse to very coarse sand, some gravel and fine to medium sand, trace silt; medium dense; saturated (SW).	
SS5	23 - 25	9/13/17/19	24	Top 18": Same as above (SW). Bottom: Yellowish brown fine to medium sand; dense; saturated (SP).	
SS6	28 - 30	6/10/22/48	24	Brown coarse to very coarse sand, some gravel, some very fine to medium sand, trace silt; very dense; saturated (SW).	E.O.B. @ 30.5'

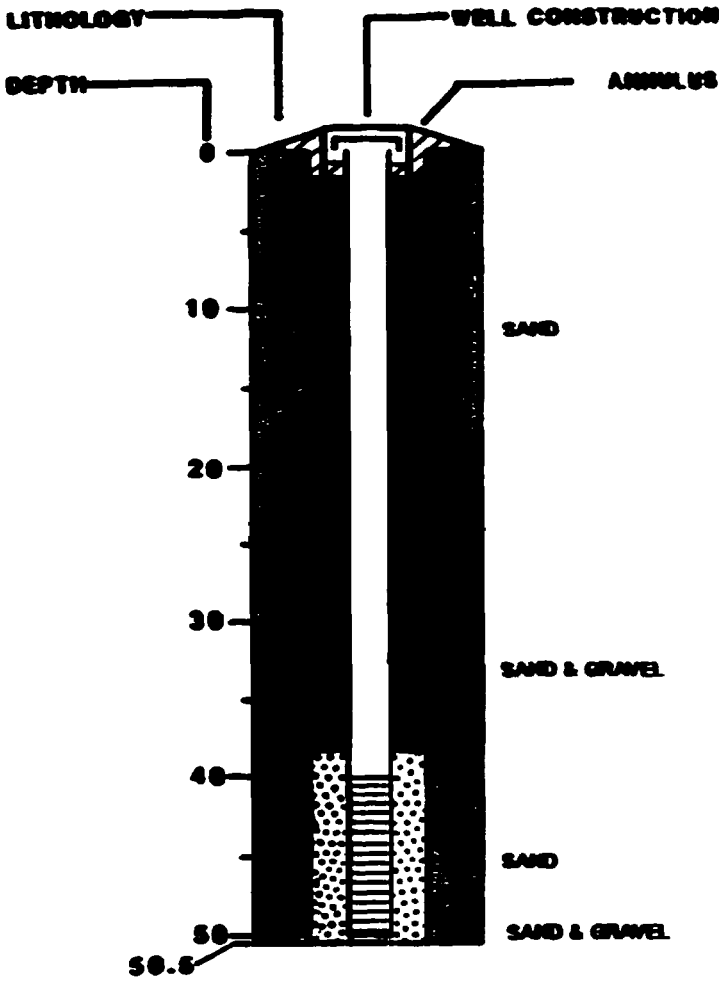
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW34I
Location North of car shop near LSA15
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 744.33'
Drilling Firm Bergerson Caswell
Geologist R. Hackler
Start & Completion Date 10/19/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 50.5'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 40'-50'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 38'-50'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 8.5'
After Drilling 8.5' (10/31/91)
After Completion 8.59' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZF3000

Well No. MW34I

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	4/3/3/3	18	Dark yellowish brown medium to fine sand: loose: moist (SP).	
SS2	8 - 10	5/6/4/21	11	Same as above except coarsening downward (a rock in drive shoe): saturated (SW).	Difficult drilling at 10'.
SS3	13 - 15	11/5/ 11/21	16	Brown medium to very coarse sand, some fine gravel, little fine sand; dense; saturated (SW).	
SS4	18 - 20	6/6/10/12	24	Brown medium to fine sand, some gravel, little very coarse sand: medium dense; saturated (SW).	
SS5	23 - 25	7/7/7/10	22	Top 12": Same as above (SW). Bottom: Brown medium to very coarse sand and gravel: medium dense; saturated (SP-GP).	
SS6	28 - 30	21/80 for 3"	12	Same as above (SP-GP).	Difficult drilling at 30'.
SS7	33 - 35	21/70 - refuse	12	Same as above (SP-GP).	
SS8	38 - 40	19/27/ 125- refuse	15	Same as above (SP-GP).	
SS9	43 - 45	12/10/ 10/20	24	Brown medium to very fine sand; dense; saturated (SW).	
SS10	48 - 50	7/12/ 18/20	20	Top 13": Same as above (SW). Bottom: Brown medium to fine sand and gravel, trace silt: dense; saturated (SP-GP).	E.O.B. @ 50.5'

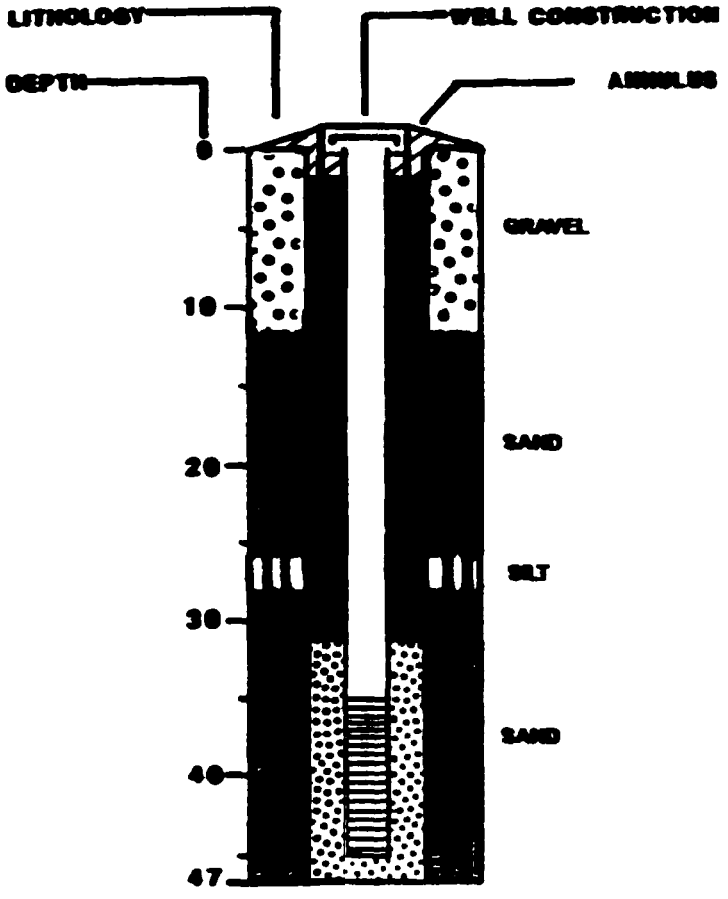
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW33I
Location Near LSA30 between tracks 63 & 61
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 745.31'
Drilling Firm Bergerson Caswell
Geologist R. Hackler
Start & Completion Date 10/16/91
Type of Rig CME 75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 47'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 35'-45'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 32'-47'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 9'
After Drilling 7.6' (10/30/91)
After Completion 7.16' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZF3000

Well No. MW33I

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	7/4/4/4	0	No recovery; possibly still in railroad ballast.	
SS2	8 - 10	9/9/ 23/25	8	Yellowish brown fine to coarse gravel, little sand, little silt; dense; saturated (GW).	
SS3	13 - 15	8/8/8/10	20	Yellowish brown very coarse sand, little gravel; medium dense; saturated (SP).	1' blowup
SS4	18 - 20	8/15/ 15/24	20	Same as above except some gravel and little fine to medium sand (SW).	
SS5	23 - 25	10/10/ 12/15	12	Same as above (SW).	Difficult drilling at 27'. Driller thinks there was silt from 25'-28'.
SS6	28 - 30	4/18/ 35/32	24	Same as above except for 3" silt stringer at 29' (SW).	
SS7	33 - 35	10/18 22/28	24	Same as above (SW).	
SS8	38 - 40	20/30/ 30/40	12	Same as above (SW).	
SS9	43 - 45	14/15/ 17/22	18	Same as above (SW).	E.O.B. @ 47'

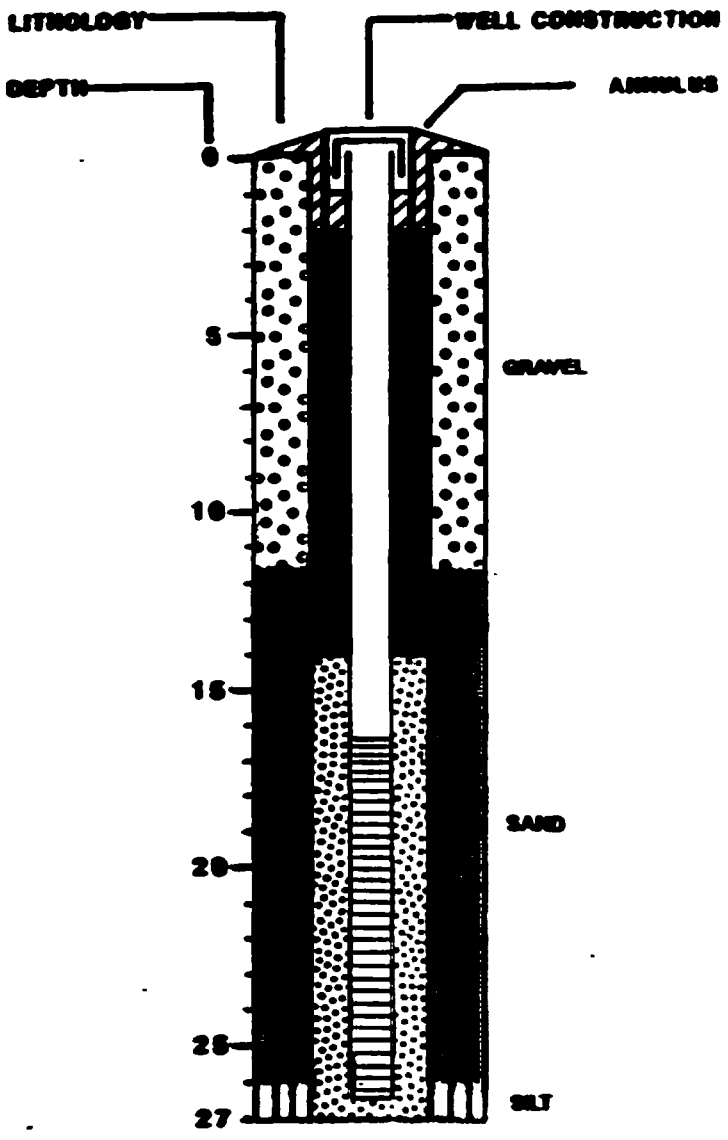
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW33S
Location 4' west of MW33I
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 745.40'
Drilling Firm Borgerson Caswell
Geologist R. Hackler
Start & Completion Date 10/16/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 27'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 16.5'-26.5'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 14'-27'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 7.8'
After Drilling 7.3' (10/30/91)
After Completion 5.05' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZP3000

Well No. MW33S

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
				Drilled to 23' without sampling; see log of MW33I for stratigraphy at this location.	
SS1	23 - 25	9/12/9/12	14	Yellowish brown very coarse sand and gravel, little medium to fine sand, trace silt; medium dense; saturated (SP-GP).	MW33S sampling begins here 10/16/91. Some blowup in auger.
SS2	25 - 27	8/15/ 18/30	22	Top 12": Same as above (SP-GP). Bottom: Brown silt, little coarse sand; dense; low plasticity; dry to moist (ML).	E.O.B. @ 27'

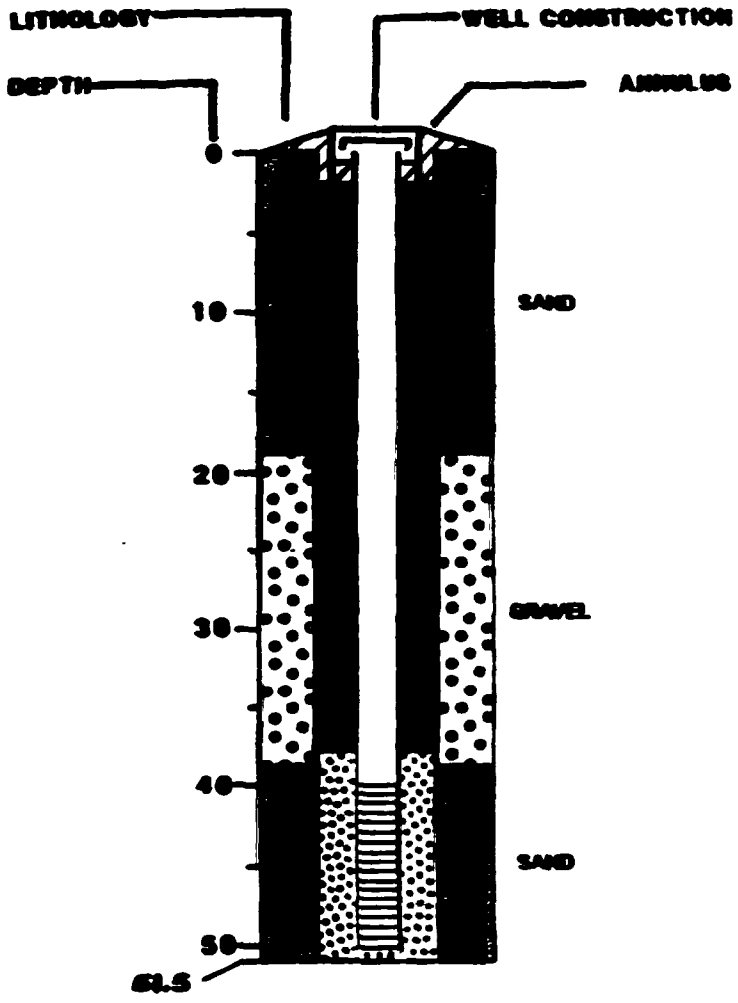
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW32I
Location
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 746.93'
Drilling Firm Bergerson Caswell
Geologist R. Heckler
Start & Completion Date 10/15/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 51.5'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 48'-50'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 38'-51.5'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 8'
After Drilling 6.6' (10/30/91)
After Completion 6.51' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

0206

Project Name Conrail site
Project Number ZF3000

Well No. MW32I

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	10/10/ 7/7	14	Light yellowish brown fine to coarse sand, little silt, little fine gravel: medium dense: dry to moist (SW).	
SS2	8 - 10	7/9/9/40	16	Brown fine to medium sand: dense: saturated (SP).	
SS3	13 - 15	5/13/ 15/20	18	Same as above (SP).	
SS4	18 - 20	4/4/4/8	23	Top 12": Same as above (SP). Bottom: Brown fine gravel with some medium to coarse sand: medium dense: saturated (GP).	
SS5	23 - 25	10/19/ 26/30	15	Same as above except little medium to coarse gravel (GW).	1' sand blowup.
SS6	28 - 30	14/20/ 40/43	18	Same as above (GW).	6" blowup.
SS7	33 - 35	6/25/ 35/60	16	Same as above (GW).	
SS8	38 - 40	7/10/ 17/26	24	Top 6": Same as above (GW). Bottom: Brown very fine to fine sand, little medium sand, trace silt: dense: saturated (SP).	
SS9	43 - 45	5/8/ 12/15	24	Brown coarse to very coarse sand, little medium sand, trace gravel, medium dense: saturated (SP).	Blowup.
SS10	48 - 50	5/2/3/4	16	Brown medium to coarse sand, some fine sand, trace gravel: loose: saturated (SW).	Overdrilled 1.5' E.O.B. @ 51.5'

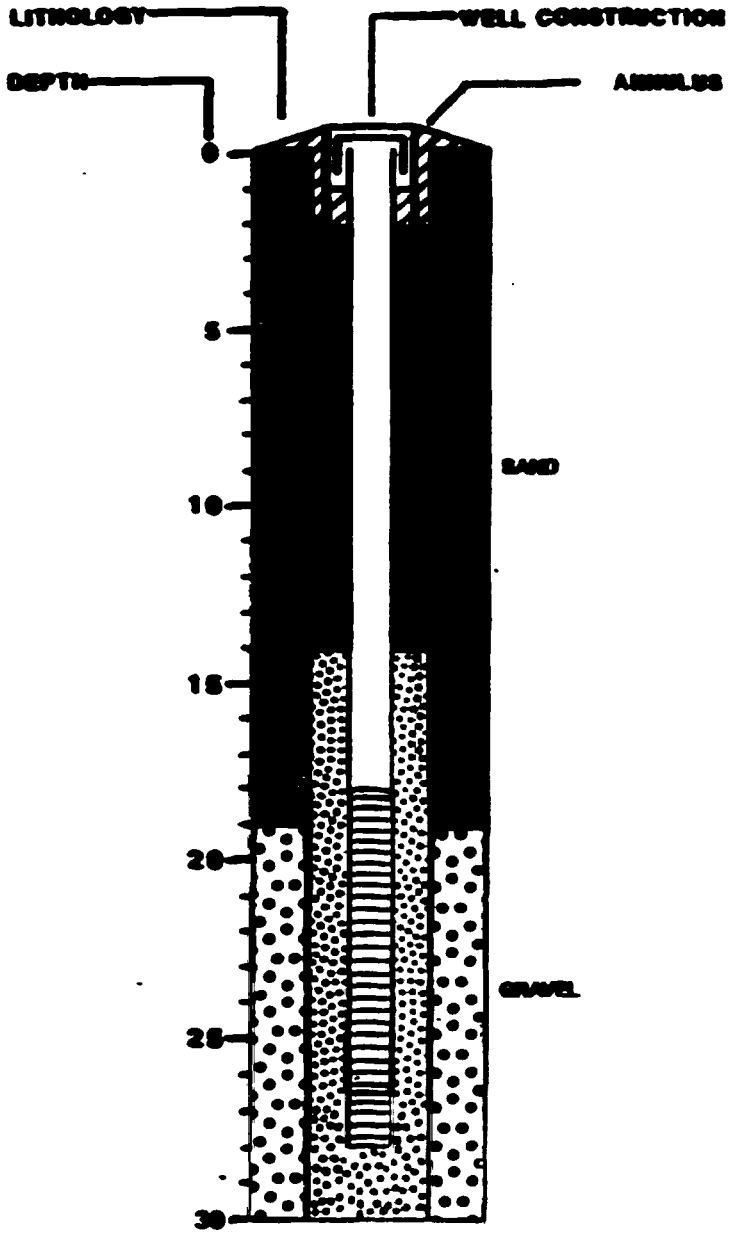
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW32S
Location Track 69 7' W. of MW32I
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 746.99'
Drilling Firm Borgerson Caswell
Geologist R. Hackler
Start & Completion Dates 10/15/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 30'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 18'-28'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 14'-30'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling Not determined
After Drilling
After Completion 4.56' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZF3060

Well No. MW32S

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	23 - 25	Not taken	6	Brown fine gravel: some medium to coarse sand: little medium to coarse gravel; medium dense; saturated (SP).	Stratigraphy for this location was determined while drilling MW32I. One split-spoon sample was collected and placed in an 8-oz. jar. E.O.B. @ 30'

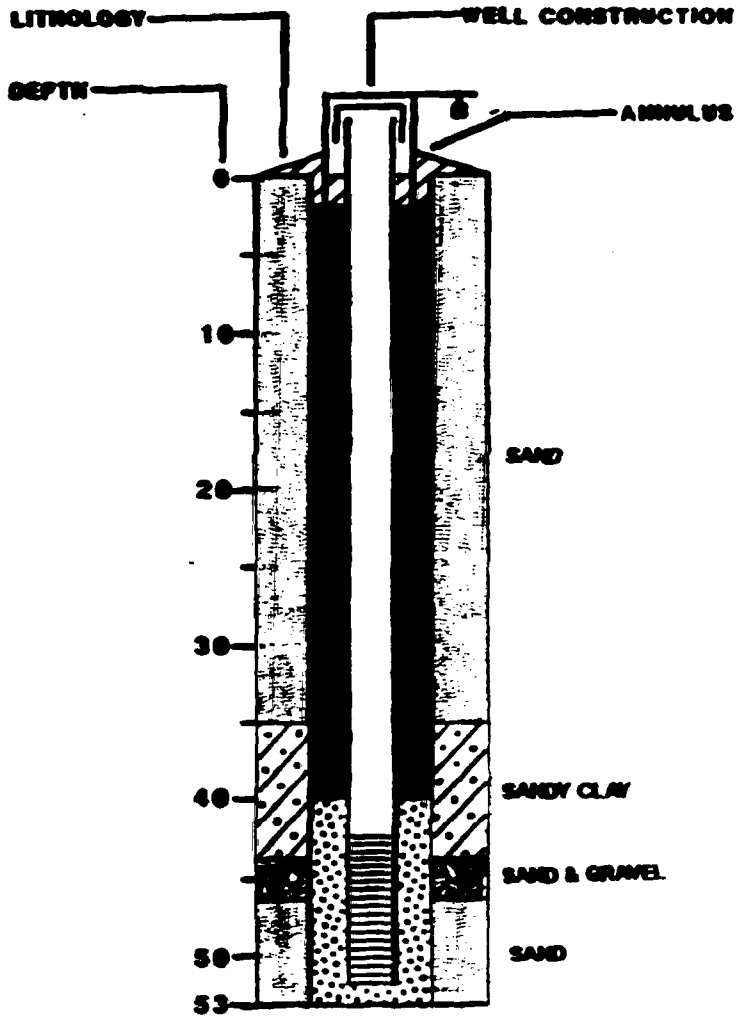
7660:1

Project Name Conrail site
Project No. 2F3000

Date Prepared
Prepared by

Well No. MW31I
Location 5' west of MW31S
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 751.82'
Drilling Firm Bergerson Caswell
Geologist R. Hackler
Start & Completion Date 10/18/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 53'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 42'-52'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack *Silica sand 40'-53'*
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 7.0'
After Drilling 6.6' (10/30/91)
After Completion 6.55' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number 2F3000

Well No. MW31I

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	3/4/4/4	18	Top 12": Yellowish brown medium to coarse sand, trace fine sand, trace silt; loose; moist (SW). Bottom: Brown medium to coarse sand, trace fine sand, trace silt; loose, moist to dry (SW).	MW31I was drilled from 0'-23' without sampling; this part of the log is from MW31S.
SS2	8 - 10	3/5/6/10	18	Brown medium to coarse sand, trace coarse to fine gravel, trace fine sand; medium dense; saturated (SW).	
SS3	13 - 15	5/10/10/10	16	Same as above (SW).	
SS4	18 - 20	5/7/5/9	23	Brown fine to medium sand, little coarse sand, trace fine gravel, trace silt; medium dense; saturated (SW).	MW31S ends here. E.O.B. @ 20'
SS1	23 - 25	9/19/10/10	18	Brown medium to fine sand with some very fine sand; medium dense; saturated (SW).	MW31I sampling begins here 10/18/91.
SS2	28 - 30	6/5/6/10	18	Same as above (SW).	
SS3	33 - 35	2/2/4/8	20	Same as above except for a 1" brown clayey silt stringer at 34' (SW).	Driller notes drilling change at 35'.
SS4	38 - 40	6/12/15/20	22	Dark gray clay with some very coarse sand and some fine to medium sand; low plasticity; dense; saturated (CL).	
SS5	43 - 45	5/8/8/8	18	Top 12": Same as above (CL). Bottom: Yellowish brown gravel and very coarse to coarse sand with trace silt; medium dense; saturated (GW).	
SS6	48 - 50	5/8/16/23	24	Brown medium to fine sand, little coarse sand; dense; saturated (SW).	Overdrilled 3' E.O.B. @ 53'

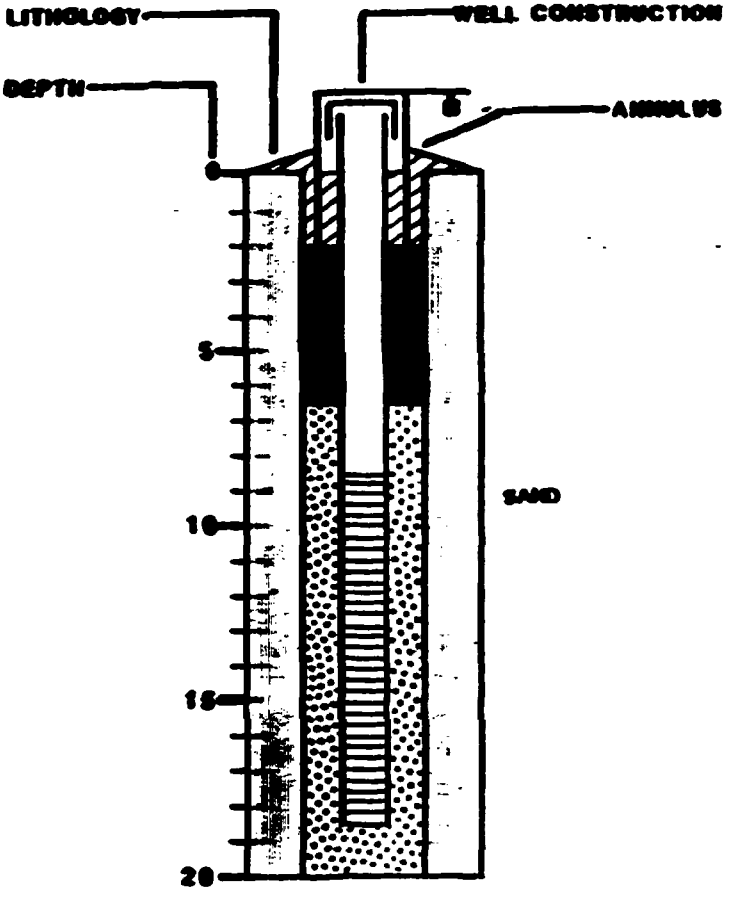
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW31S
Location ~ 100 yd. east of east pond on access road
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 751.45'
Drilling Firm Borgerson Caswell
Geologist C. Carlson
Start & Completion Date 10/07/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 9"
Boring Depth 20'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 8.5'-18.5'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 6.5'-20'
Seal Bentonite chips 5.8'-6.5'
Grout Envirogrog bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 10'
After Drilling 10.8' (11/01/91)
After Completion 10.58' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZF3000

Well No. MW31S

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	3/4/4/4	18	Top 12": Yellowish brown medium to coarse sand, trace fine sand, trace silt; loose; moist (SW). Bottom: Brown medium to coarse sand, trace fine sand, trace silt; loose; moist to dry (SW).	
SS2	8 - 10	3/5/6/10	18	Brown medium to coarse sand, trace coarse to fine gravel, trace fine sand; medium dense; saturated (SW).	
SS3	13 - 15	5/10/10/10	16	Same as above (SW).	
SS4	18 - 20	5/7/5/9	16	Brown fine to medium sand, little coarse sand, trace fine gravel, trace silt; medium dense; saturated (SW).	E.O.B. @ 20'

7660:1

roject Name Conrail site
.roject Number 2F3000

Well No. MW308R Page 2 of 3

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS4	73 - 75	24/70/100 for 4"	16	Top 12": Brown medium sand, little coarse and fine sand, trace coarse to fine gravel: very dense (SW). Bottom: Brown fine sand, trace coarse to medium sand and silt, trace fine gravel: very dense (SW).	
SS5	78 - 80	8/16/ 22/93	0	N.D.	12" loose gravel in spoon, not representative.
SS6	83 - 85	11/26/ 53/56	12	Brown coarse sand and coarse to fine gravel, trace fine to medium sand: very dense (SP-GW).	
SS7	88 - 90	4/6/ 22/31	12	Dark brown coarse to fine sand, trace coarse to fine gravel and silt: very dense (SW).	Switched to 300 lb. hammer, 140 lb. hammer too light for drilling mud.
SS8	93 - 95	10/43/ 47/53	18	Top 3": Same as above (SW). Middle 7": Brown to pale brown silty fine sand, trace medium to coarse sand (SM). Bottom: Dark brown coarse to fine sand, trace coarse to fine gravel: very dense (SW).	
SS9	98 - 100	10/37/ 48/50	18	Brown coarse to fine sand and gravel, little to trace silt: extremely dense: saturated (SW-GW).	Difficult drilling from 98'-103' (boulders).
SS10	103 - 105	19/23/ 47/57	16	Brown fine to medium sand, some coarse sand, little fine gravel, trace silt and coarse gravel: very dense: saturated (SW).	
SS11	108 - 110	23/39/ 64/73	18	Brown coarse to fine sand, trace silt and fine to coarse gravel, grading downward to fine to medium sand, trace coarse sand and fine gravel: extremely dense: saturated (SW).	
SS12	113 - 115	30/32/ 54/100	18	Brown coarse to fine sand, trace silt, little fine gravel, trace coarse gravel: extremely dense: saturated (SW).	
SS13	118 - 120	33/60/ 72/77	18	Same as above with little silt toward the bottom; very dense: saturated at top, wet at bottom (SW).	
SS14	123 - 125	24/35/ 46/70	16	Brown coarse to fine sand, little coarse to fine gravel, trace silt: extremely dense: saturated (SW).	Difficult drilling at 122', boulders.
SS15	128 - 130	24/35/ 64/81	20	Same as above (SW).	
SS16	133 - 135	23/34/ 60/92	20	Same as above except some coarse to fine gravel (SW).	

*660:1

Project Name Conrail site
Project Number ZP3000

Well No. MW30BR Page 3 of 3

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS17	138 - 140	11/18/ 21/31	20	Same as above (SW).	
SS18	143 - 145	12/19/ 22/46	18	Top 6": Brown fine gravel, some coarse sand, trace fine to medium sand and coarse gravel; loose (GP). Next 2": Dark gray clay; wet; high plasticity (CL). Next 5": Brown coarse sand, little fine gravel (SP). Next 1": Reddish brown to brown clay; moist (CL). Bottom: Brown coarse sand, little fine gravel, trace fine to medium sand; dense; saturated (SP).	
SS19	148 - 149	12/100/ 100 for 4"	10	Olive gray shale; top 1" contains some iron staining; moderately fissile.	E.O.B. @ 149'

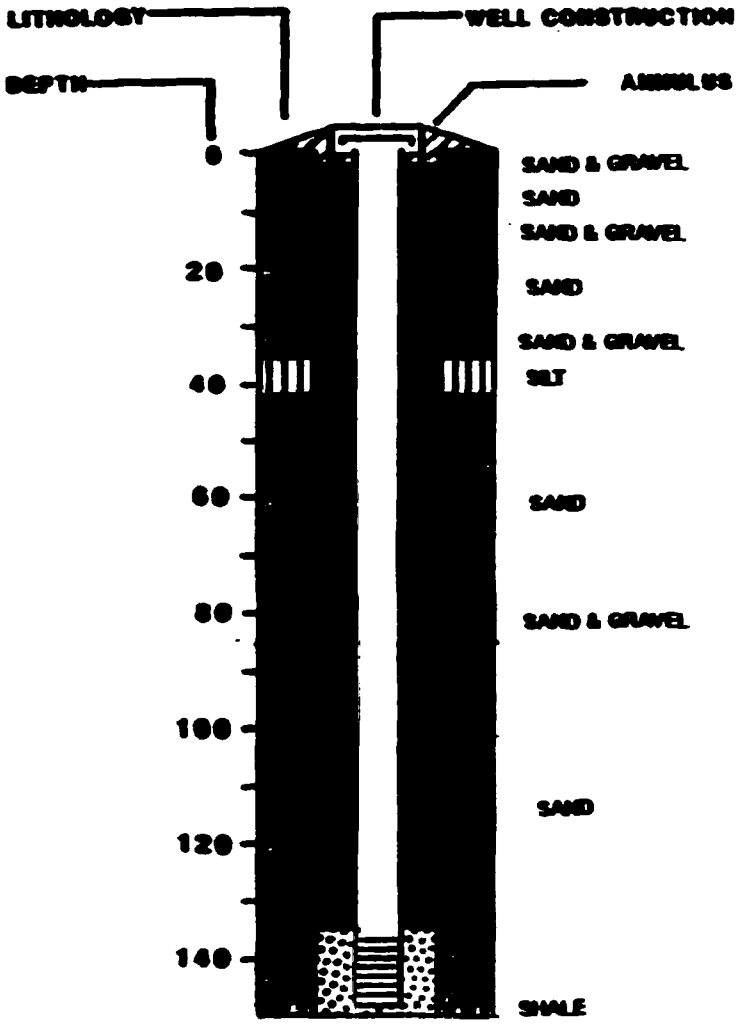
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW30BR
Location West end of classification yard between tracks 39 and 40
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 747.94'
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Dates 10/15 & 10/16/91
Type of Rig Gus Pech

Method of Drilling Mud rotary



WELL DATA

Boring Diam. 8"
Boring Depth 140'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 137'-147'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 135'-147'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 7.3'
After Drilling 9.8' (10/31/91)
After Completion 9.17' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

7660:1

558047

Project Name Conrail site
Project Number ZP3000

Well No. MW30BR Page 1 of 3

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	6/4/3/3	6	Yellowish brown clayey sand and gravel, little silt, (fill); loose; moist.	MW30BR was drilled from 0'-58' without sampling; this part of the log is from MW30I.
SS2	8 - 10	12/8/ 10/18	10	Brown coarse sand, little fine gravel and clay, trace fine to medium sand and coarse gravel; medium dense; wet (SP).	
SS3	13 - 15	27/10/ 7/8	14	Yellowish brown coarse sand and fine gravel, some silt and clay, trace fine to medium sand and coarse gravel; medium dense; saturated (SM-GM).	
SS4	18 - 20	3/5/ 27/50	20	Brown medium to coarse sand, some coarse to fine gravel, little fine sand, trace silt, trace small cobbles; very dense; saturated (SW).	
SS5	23 - 25	13/15/ 8/12	22	Same as above except medium dense (SW).	
SS6	28 - 30	9/12/ 19/29	20	Top 3": Same as above (SW). Middle 9": Pale brown silty clay to clayey silt, trace fine sand, trace coarse to fine gravel; very dense; moist (ML-CL). Bottom: Brown fine to medium sand, trace coarse sand, trace silt; dense; saturated (SW).	
SS7	33 - 35	1/2/ 10/23	18	Brown coarse sand and fine gravel, trace silt and clay, trace fine sand and coarse gravel; dense; saturated (SP-GP).	
SS8	38 - 40	14/40/ 42/60	18	Pale brown clayey silt to sandy silt, trace coarse to fine sand and fine gravel; extremely dense; moist to wet (ML-CL).	
SS9	43 - 45	25/125/ 175/200	20	Pale brown fine sand, little coarse sand and coarse to fine gravel at top, little silt; extremely dense; saturated (SP).	
SS10	48 - 50	4/6/ 40/40	24	Brown silt, medium sand, little coarse sand, little fine sand, trace fine gravel; very dense; saturated (SP).	
SS11	53 - 55	18/34/ 42/40	18	Pale brown fine to medium sand, little silt, trace coarse sand and fine gravel; very dense; saturated (SP).	MW30I ends here. E.O.B. @ 55'
SS1	58 - 60	13/48 60/37	18	Brown to grayish brown medium sand, little coarse and fine sand, trace silt and fine gravel; very dense; saturated (SW).	MW30BR sampling begins here 11/15/91
SS2	63 - 65	22/49/ 58/91	18	Same as above except dark brownish gray (SW).	
SS3	68 - 70	22/61/ 94/93	20	Same as above except brown (SW).	

7660:1

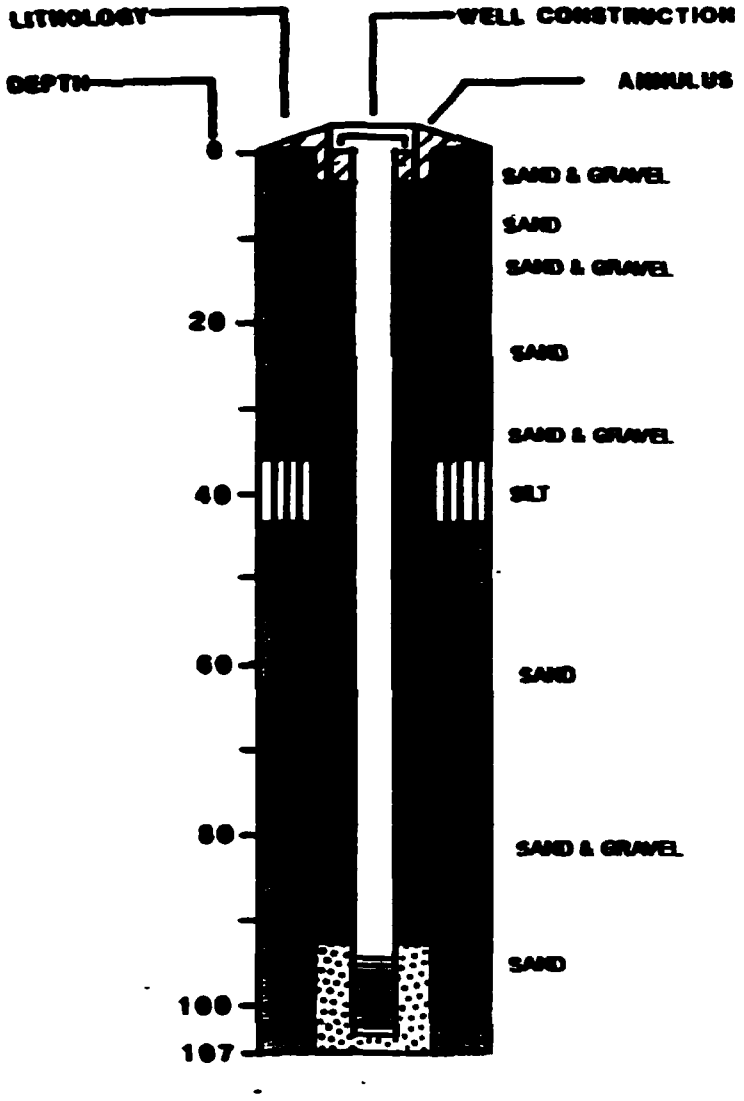
0217

Project Name Conrail site
Project No. 2F3000

Date Prepared
Prepared by

Well No. MW30D
Location West end of classification yard between tracks 39 and 40
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 748.09'
Drilling Firm Borgerson Caswell
Geologist B. Hackler
Start & Completion Date 10/20/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 107'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 94.7'-104.7'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 92.7'-107'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 9.2'
After Drilling 9.1' (10/31/91)
After Completion 9.28' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

7660:1

558047

recycled paper

0218

Project Name Conrail site
Project Number ZF3000

Well No. MW30D

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
				Drilled to 107' for well construction without sampling. See log MW30BR for stratigraphy at this location.	E.O.B. @ 107'

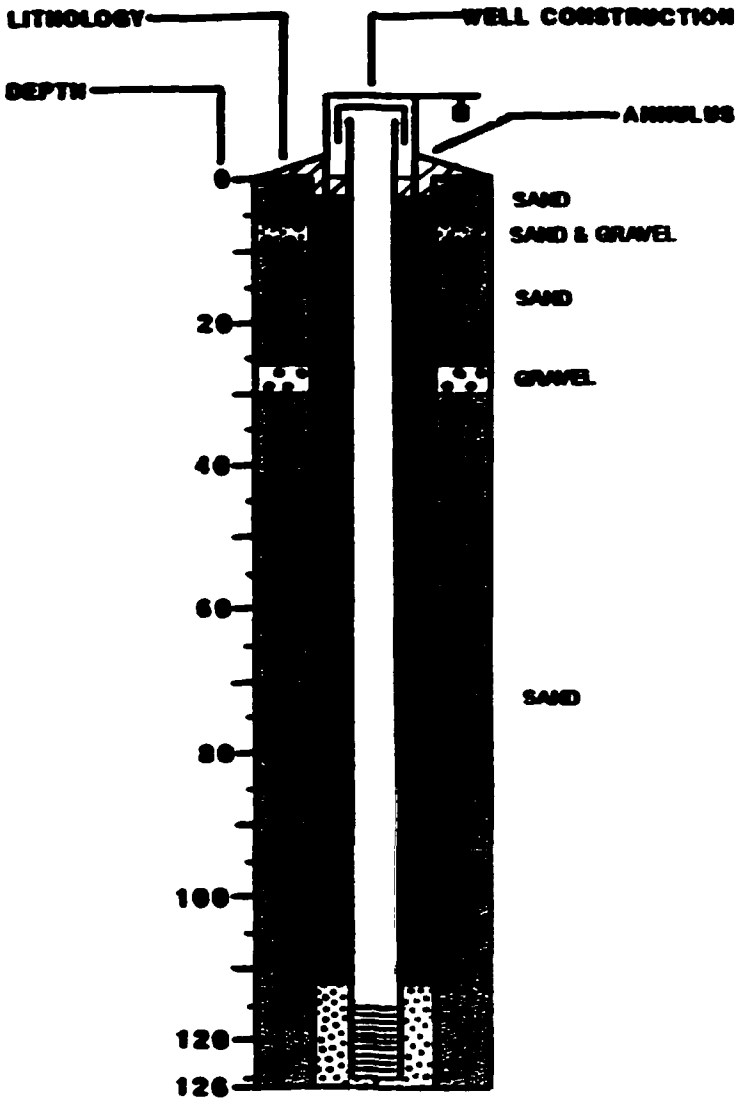
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW4D
Location East of Ash Rd. opposite Charles Ave.
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 739.71'
Drilling Firm Bergerson Caswell
Geologist L. Lueck
Start & Completion Dates 11/04-11/05/91
Type of Rig Gus Pech

Method of Drilling Mud rotary



WELL DATA

Boring Diam. 8"
Boring Depth 125'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 115'-125'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 112'-125'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 14.8'
After Drilling 16.5' (11/06/91)
After Completion 16.63' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZP3000

Well No. MW44D Page 1 of 2

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	3/4/5/6	6	Brown fine to coarse sand; medium dense; moist (SW).	Driller uses only about 20" hammer drop, blow counts abnormally high.
SS2	8 - 10	3/3/7/12	14	Brown sand and gravel (SW-GW), grading down to light brown fine sand; medium dense; moist (SP).	
SS3	13 - 15	6/11/ 11/11	13	Brown fine to coarse sand, little fine to medium gravel; medium dense; wet (SW)	
SS4	18 - 20	11/17/ 23/29	8	Brown medium to coarse sand, trace gravel, trace fine sand; very dense; wet (SW)	
SS5	23 - 25	11/9/ 23/29	18	Medium brown fine sand, little silt, trace clay, trace fine to medium gravel; very dense; wet (SP).	
SS6	28 - 30	17/33/ 50/75	0	Coarse sand and gravel.	Driller's guess. Somewhat hard drilling 30'-33'; small tan clay balls in cuttings.
SS7	33 - 35	15/28/ 37/40	19	Tan fine sand, little medium sand; very dense; wet (SP).	
SS8	38 - 40	21/21/ 21/26	18	Light brown fine to medium sand, trace silt; dense; wet (SP).	
SS9	43 - 45	21/27/ 41/50	19	Same as above (SP).	
SS10	48 - 50	21/44/ 57/61	18	Same as above (SP).	
SS11	53 - 55	13/30/ 40/50	22	Same as above (SP).	
SS12	58 - 60	20/20/ 20/20	21	Medium brown fine to medium sand, little coarse sand, little silt, trace fine gravel; medium dense; wet (SW).	
SS13	63 - 65	19/22/ 28/30	20	Brown fine to coarse sand, trace fine to medium gravel, trace silt; very dense; wet (SW).	
SS14	68 - 70	24/40/ 40/41	19	Brown medium to coarse sand, little fine gravel, trace fine sand, trace silt; extremely dense; wet (SW).	
SS15	73 - 75	19/30/ 30/30	18	Same as above (SW).	
SS16	78 - 80	21/49/ 50/50	21	Same as above (SW).	

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roject Name Conrail site Well No. MW43BR Page 2 of 3
roject Number 271000

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS10	63 - 65	16/19/ 30/33	18	Brown fine to coarse sand, some gravel, grading down to fine to medium sand; bottom 1 1/2" distinctly reddish brown; very dense; wet (SW).	
SS11	68 - 70	24/35/ 49/53	21	Brown fine to coarse sand, trace to little fine gravel; extremely dense; wet (SW).	
SS12	73 - 75	15/29/ 44/46	18	Same as above (SW).	
SS13	78 - 80	20/23/ 42/46	17	Brown fine to medium sand; extremely dense; wet (SP)	
SS14	83 - 85	27/41/ 50/58	23	Brown fine to coarse sand, trace fine to medium gravel; extremely dense; wet (SW).	
SS15	88 - 90	21/28/ 31/40	21	Brown fine to coarse sand, trace fine to medium gravel; very dense; wet (SW).	
SS16	93 - 95	36/41/ 90/100	17	Brown fine to coarse sand, little fine to medium gravel, trace silt; thin clay rind on bottom 2" of sample; extremely dense; wet (SW).	
SS17	98 - 100	26/45/ 62/75	21	Brown fine to coarse sand, trace fine to medium gravel, trace silt; extremely dense; wet (SW).	
SS18	103 - 105	19/19/ 34/42	18	Brown fine to medium sand, little fine to medium gravel, trace silt; very dense; wet (SW).	Rough drilling from about 104'-108'
SS19	108 - 110	22/34/ 56/61	15	Brown fine to coarse sand, some gravel, trace silt; extremely dense; wet (SW).	
SS20	113 - 115	18/23/ 43/53	14	Brown to orange-brown sand and gravel (some gravel clasts 1.5"), trace silt; extremely dense; wet (SW-GW).	Orange color seems to come from crushed orange gravel and a plug of orange silt in drive shoe.
SS21	118 - 120	22/29/ 61/63	19	Brown fine to medium sand, trace fine gravel; extremely dense; wet (SP).	
SS22	123 - 125	33/61/ 67/75	21	Reddish brown fine to coarse sand, trace fine gravel (also few 1" layers with little fine to medium gravel), trace silt; extremely dense; wet (SW).	
SS23	128 - 130	28/26/ 55/64	14	Tannish brown fine to coarse sand, little fine to coarse gravel, trace silt; extremely dense; wet (SW).	
SS24	133 - 135	18/23/ 30/40	16	Brown fine to medium sand; very dense; wet (SP).	

:660:1

Project Name Conrail site
Project Number ZF3000

Well No. MW43BR Page 3 of 3

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS25	138 - 140	15/26/ 31/54	13	Same as above but extremely dense (SP).	
SS26	143 - 145	18/26/ 26/34	18	Tannish brown fine sand, little medium sand: very dense; saturated (SP).	
SS27	148 - 150	15/28/ 32/42	20	Same as above (SP).	
SS28	153 - 155	15/34/ 41/56	14	Brown fine to coarse sand, little fine gravel, trace silt; extremely dense; wet (SW).	
SS29	156.5'-158.5'	98/100/ 100 for 3"	10	Top 3": Gravel with some coarse sand (GW). Bottom 7": Bluish gray shale bedrock.	Rough drilling, abundant gravel in cuttings; drill not advancing past 156.5' E.O.B. @ 158.5'

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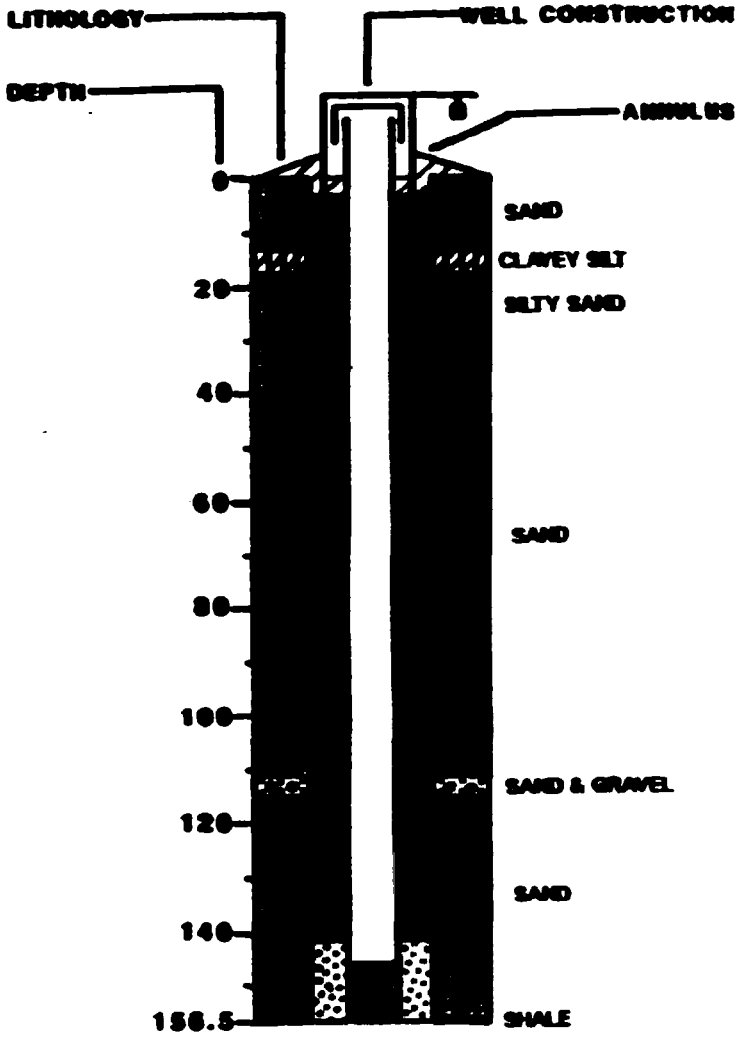
Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW3BR
Location Near west end of Charles Ave.
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 728.60'
Drilling Firm Bergerson Caswell
Geologist L. Leeck
Start & Completion Dates 11/01-11/03/91
Type of Rig Gus Pech

Method of Drilling Mud rotary



WELL DATA

Boring Diam. 8"
Boring Depth 158.5'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 146.5'-156.5'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 141'-156.5'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 6.7'
After Drilling 9.4' (11/04/91)
After Completion 9.08' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZF3000

Well No. MW43BR Page 1 of 3

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	6/5/3/4	20	Top 12": Dark brown fine to medium sand, trace coarse sand and clay; wet (SP). Bottom: Brownish yellow fine to medium sand, trace coarse sand and fine gravel; loose; moist (SP).	MW43BR was drilled to 18' without sampling; this part of the log is from MW43S.
SS2	8 - 10	6/4/3/5	16	Brownish yellow silty fine sand to fine sand, some silt, trace medium sand; loose; saturated (SM).	
SS3	13 - 15	6/9/11/12	18	Top 12": Brown medium sand, little fine and coarse sand, trace fine gravel; medium dense; saturated (SP). Bottom: Pale brown clayey silt, trace coarse to fine sand; dense; moist to dry (ML).	
SS4	16 - 18	6/8/16/30	16	Same as above (ML).	MW43S ends here E.O.B. @ 18' MW43BR sampling begins here 11/01/91
SS1	18 - 20	41/61/ 65/56	16	Top 3": Grayish tan clayey silt, trace fine to medium gravel (ML). Bottom: Tan silty sand, trace gravel, with layers of sandy silt approximately 1" thick; extremely dense; moist (SM).	Driller uses only about 20" hammer drop, blow counts abnormally high.
SS2	23 - 25	27/41/ 57/61	12	Brownish gray fine to medium sand, trace fine gravel in upper 2"; extremely dense; saturated (SP). 1" of hard grayish clayey silt in drive shoe (ML).	Slow drilling from 23' to 28'; abundant small clay balls in cuttings.
SS3	28 - 30	20/43/ 47/51	24	Dark gray sandy silt, trace fine gravel; hard; moist (ML).	
SS4	33 - 35	20/28/ 46/53	21	Brown fine to medium sand, trace coarse sand; extremely dense; wet (SP).	
SS5	38 - 40	30/33/ 34/46	16	Brown fine to medium sand (gravel clast 1.5" diameter on top); very dense; wet (SP).	Below 40' driller reports going through "clay" again.
SS6	43 - 45	22/25/ 49/50	19	Brown fine to medium sand, trace coarse sand; extremely dense; wet (SP).	
SS7	48 - 50	14/14/ 22/28	18	Brown fine sand, little silt; dense; saturated (SM).	
SS8	53 - 55	14/15/ 22/30	23	Brown fine to medium sand, trace coarse sand in 1" bands; very dense; wet (SP).	
SS9	58 - 60	14/18/ 28/33	18	Brown fine to coarse sand, trace fine to medium gravel; very dense; wet (SW).	

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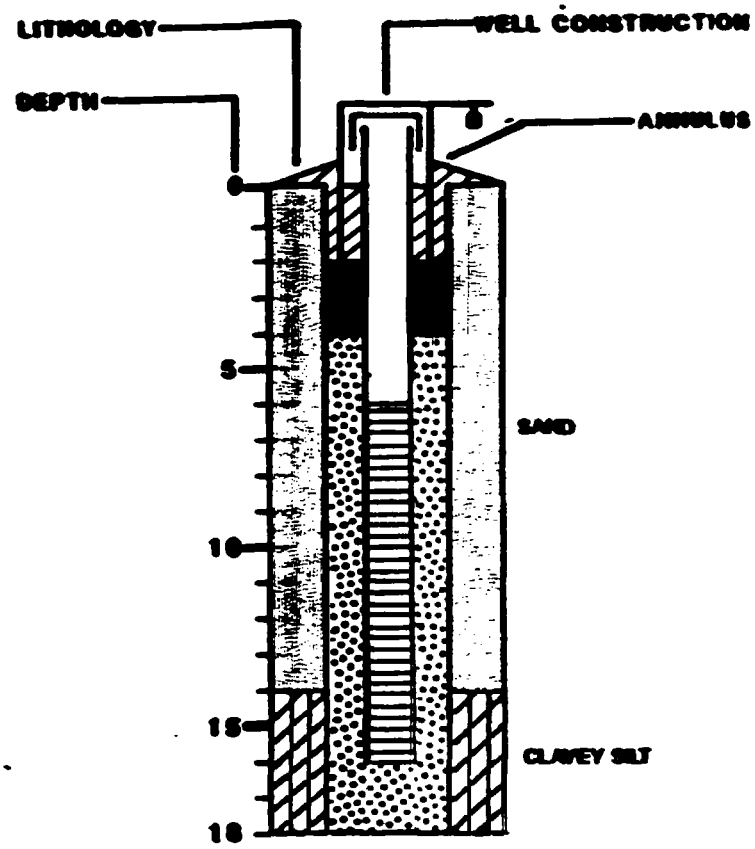
Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW03S
Location Near west end of Charles Ave.
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 728.92'
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/30/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 17'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 6'-16'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 4'-18'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 7.6'
After Drilling 8.5' (11/04/91)
After Completion 7.76' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

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558047

Project Name Conrail site
Project Number ZF3000

Well No. MW43S

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	6/5/3/4	20	Top 12": Dark brown fine to medium sand, trace coarse sand and clay; wet (SP). Bottom: Brownish yellow fine to medium sand, trace coarse sand and fine gravel; loose; moist (SP).	
SS2	8 - 10	6/4/3/5	16	Brownish yellow silty fine sand to fine sand,some silt, trace medium sand; loose; saturated (SM).	
SS3	13 - 15	6/9/11/22	18	Top 12": Brown medium sand, little fine and coarse sand, trace fine gravel; medium dense; saturated (SP). Bottom: Pale brown clayey silt, trace coarse to fine sand; dense; moist to dry (ML).	
SS4	16 - 18	6/8/16/30	16	Same as above (ML).	E.O.B. @ 18'

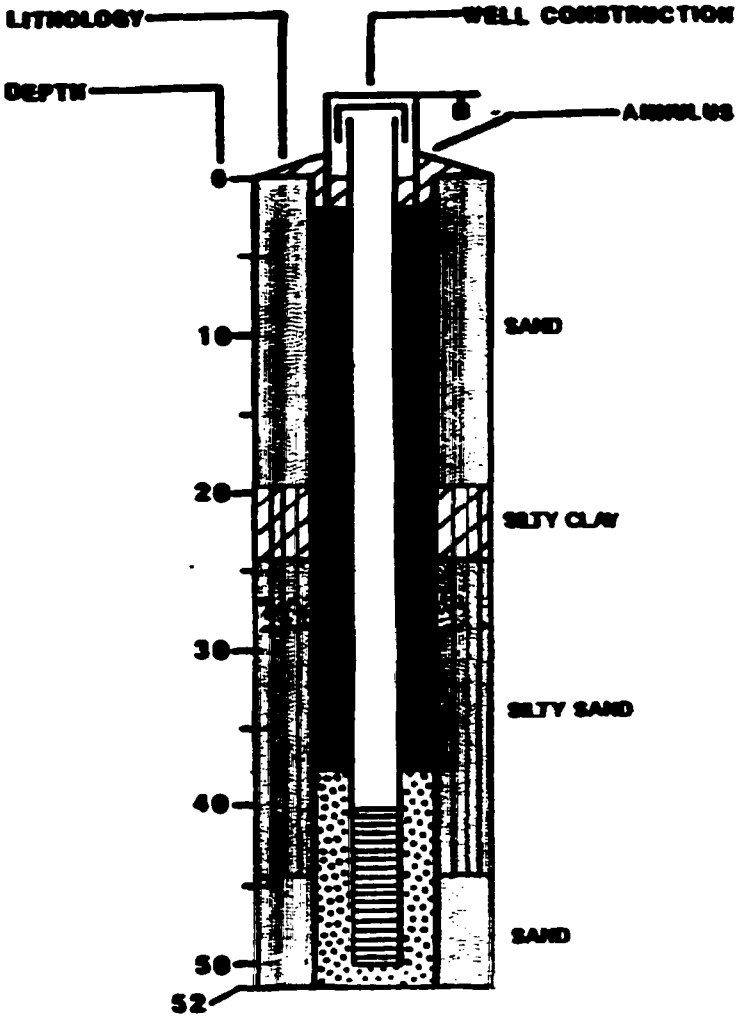
7660:1

Project Name Conrail site
Project No. 2F3000

Date Prepared
Prepared by

Well No. MW02I
Location U.S. 33 at intersection CR1
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev.
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/30/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 52'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 40.1'-50.1'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 38'-52'
Seal N/A
Grout Envirogleg bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 5.5'
After Drilling 10.4' (11/02/91)
After Completion 9.99' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZF3000

Well No. MW42I

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	4/1/2/3	14	Brown coarse sand, little coarse to fine gravel, trace clay and fine (SP).	Probable fill material.
SS2	8 - 10	4/5/4/7	14	Brown coarse to fine sand, little fine gravel, trace coarse gravel and clay; medium dense; saturated (SW).	
SS3	13 - 15	5/10/ 12/8	16	Same as above with fine to medium gravel in drive shoe (SW).	
SS4	18 - 20	10/14/ 20/25	24	Top 18": Same as above (SW). Bottom: Pale brown silty clay to clayey silt, trace coarse to fine sand, trace fine gravel; dense; moist (ML-CL).	
SS5	23 - 25	8/10/ 32/36	18	Top 12": Same as above (ML-CL). Bottom: Brown silty fine sand, trace medium sand; dense; saturated (SM).	
SS6	28 - 30	10/20/ 35/40	16	Top 6": Fine gravel, little coarse to medium sand; saturated (GP). Bottom: Brown silty fine sand; very dense; saturated (SM).	
SS7	33 - 35	12/15/ 32/40	20	Same as above, but with 4" coarse sand and fine gravel lense from 34' - 34.3' (SM).	
SS8	38 - 40	10/20/ 20/25	20	Same as above (SM).	
SS9	43 - 45	12/20/ 20/20	24	Top 18": Same as above (SM). Bottom: Brown medium sand, little coarse and fine sand, trace silt and fine gravel; dense; saturated (SP).	
SS10	48 - 50	4/15/ 20/23	24	Top 12": Brown fine sand, little silt, trace medium sand; dense; saturated (SP). Bottom: Brown fine to medium sand, little coarse sand, trace silt; dense; saturated (SW).	E.O.B. @ 52'

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Project Name Conrail site
Project Number 2F3000

Well No. MW41 Page 2 of 2

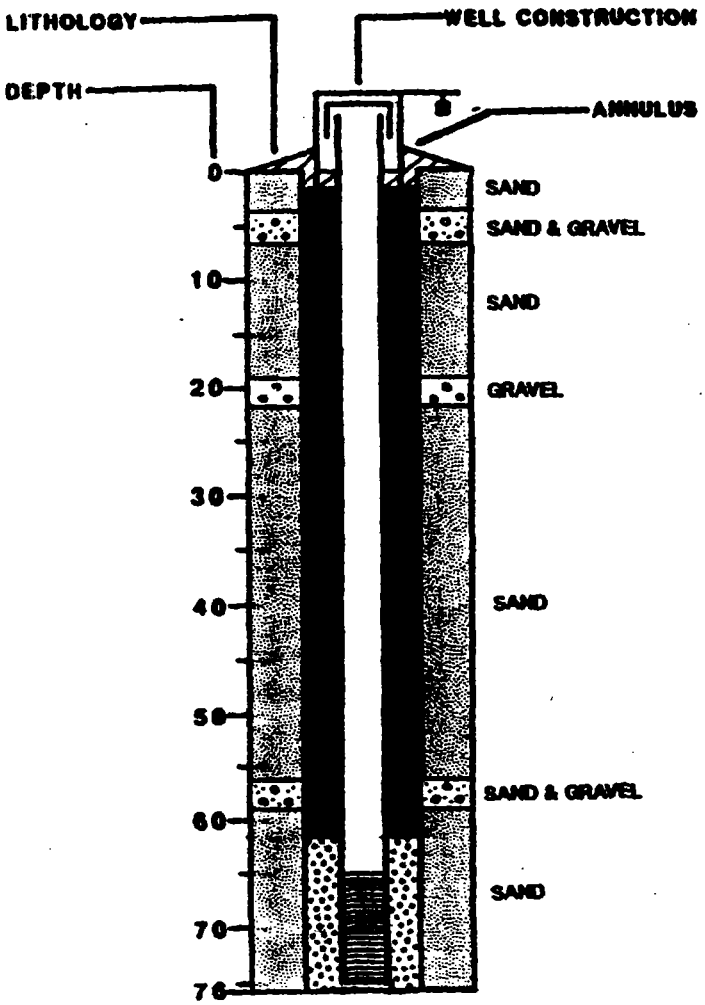
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS13	63 - 65	11/20/ 23/40	24	Same as above (SW).	
SS14	68 - 70	18/23/ 27/37	24	Same as above (SW).	
SS15	73 - 75	10/14/ 40/45	24	Same as above but with two fine sand seams from 73.4'-73.7' and 74.6'-75' (SW).	E.O.B. @ 75'

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW4I
Location Highway 33 east of CR1
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 711.55'
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/29/91
Type of Rig CME 75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 75'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 65'-75'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 62.5'-75'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 6'
After Drilling 7.3' (11/02/91)
After Completion 7.00' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZP3000

Well No. SB01

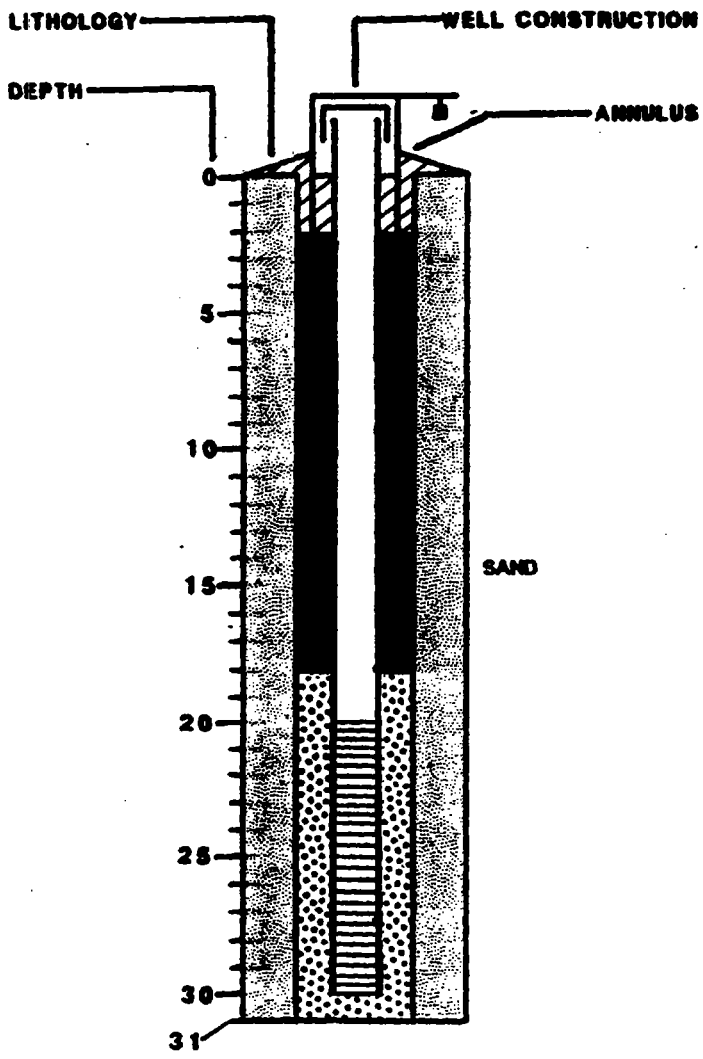
Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	5/3/3/4	20	Top 7": Grayish brown medium to coarse sand, trace fine sand, trace clay; moist. Bottom: Dark gray coarse sand and fine gravel, limestone fragments, some clay; loose; moist.	Probable fill material
SS2	8 - 10	5/5/7/7	20	Brown medium to coarse sand, some fine gravel, trace coarse gravel and clay; medium dense; saturated (SW).	
SS3	13 - 15	9/16/16/25	24	Brown medium to coarse sand, little fine gravel, trace fine sand silt; dense; saturated (SW).	
SS4	18 - 20	15/25/25/32	24	Top 12": Same as above (SW). Bottom: Very dark grayish brown coarse to fine gravel, some coarse sand, trace silt and fine sand; very dense; saturated (GW).	
SS5	23 - 25	1/8/16/25	24	Top 12": Dark grayish brown medium to coarse sand, trace fine gravel and fine sand; dense; saturated (SP). Bottom: Yellowish brown silty fine sand; dense; saturated (SM).	
SS6	28 - 30	1/5/25/55	24	Yellowish brown fine to medium sand, trace silt; very dense; saturated (SP).	
SS7	33 - 35	6/16/35/60	24	Top 14": Same as above (SP). Bottom: Yellowish brown silty fine sand; dense; saturated (SM).	
SS8	38 - 40	6/7/10/20	24	Top 12": Yellowish brown fine to medium sand, trace silt; dense; saturated (SP). Middle 6": Yellowish brown silty fine sand; saturated (SM). Bottom: Yellowish brown fine to medium sand, trace silt; dense; saturated (SP).	
SS9	43 - 45	9/12/35/50	24	Same as above; very dense (SP).	
SS10	48 - 50	5/25/50/-	24	Top 12": Brown medium sand, trace coarse sand, fine sand, and fine gravel; medium dense; saturated (SP). Middle 6": Yellowish brown silty fine sand (SM). Bottom: Brown medium sand, trace coarse sand, fine sand, and fine gravel; dense; saturated (SP).	
SS11	53 - 55	3/3/4/12	24	Same as above; medium dense (SP).	
SS12	58 - 60	6/21/30/40	24	Top 12": Brown fine gravel and coarse sand, trace coarse gravel and fine to medium sand; saturated (SP-GP). Bottom: Very dark grayish brown coarse sand, some coarse to fine gravel, little fine to medium sand; very dense; saturated (SW).	

Project Name Conrail site
Project No. 2F3000

Date Prepared
Prepared by

Well No. MW40
Location 1530 S. of Alco Tool Supply
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 752.88'
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/28/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 31'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 20'-30'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 18'-30'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 11.5'
After Drilling 14.3' (11/02/91)
After Completion 14.07' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number 273000

Well No. MW40

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	3/3/3/4	16	Dark yellowish brown medium to coarse sand, little fine gravel, trace fine sand and silt, trace cobble: loose: moist (SW).	
SS2	8 - 10	6/8/8/10	16	Pale brown medium to coarse sand, little coarse to fine gravel, trace fine sand: medium dense: moist to dry (SW).	
SS3	13 - 15	4/4/5/8	16	Brown fine to medium sand, some coarse sand, trace fine gravel: medium dense: saturated (SW).	
SS4	18 - 20	4/4/6/10	16	Same as above (SW).	
SS5	23 - 25	4/7/11/15	16	Top 6": Same as above except coarse to fine sand (SW). Bottom: Yellowish brown fine sand, little medium sand, trace silt, medium dense: saturated (SP).	
SS6	28 - 30	4/6/10/12	24	Brown to yellowish brown medium to coarse sand, trace fine sand and fine gravel, grading down to medium sand, some fine sand, trace coarse sand: medium dense: saturated (SW).	E.O.B. @ 31'

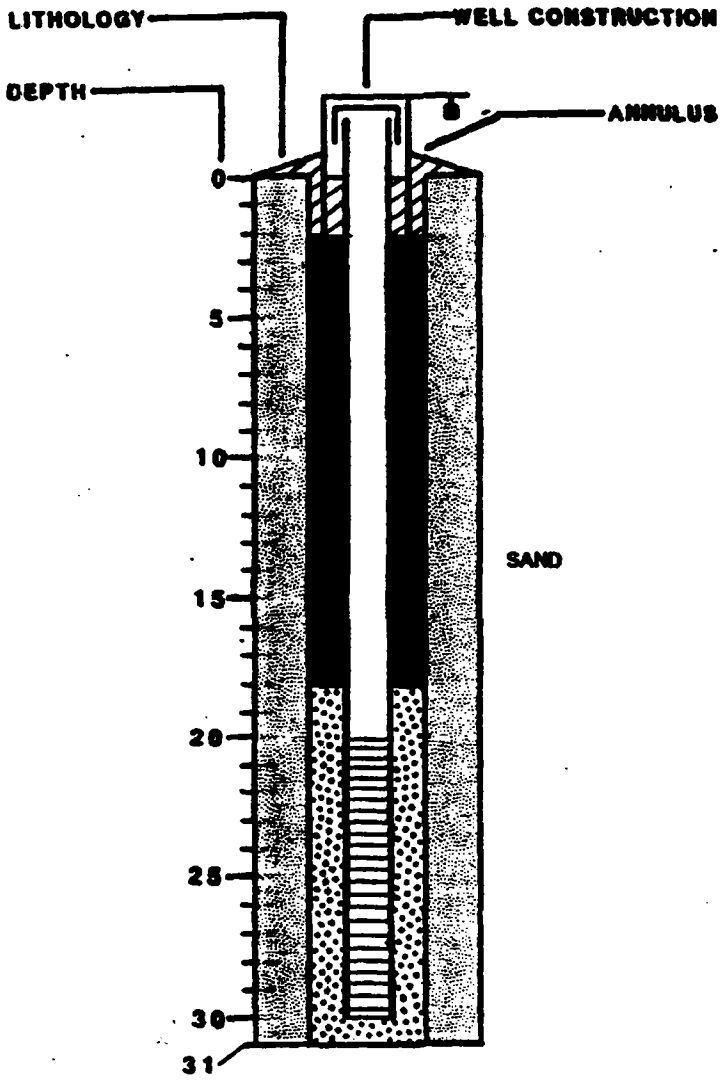
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW30
Location Hwy. 33 S. of Redwood Restaurant
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 752.88'
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Date 10/28/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 31'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 20'-30'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 18'-30'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 12'
After Drilling 13.6' (11/02/91)
After Completion 13.42' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZF3000

Well No. MW39

Sample No.	Sample Depth From - To (Ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	6/6/2/9	16	Dark yellowish brown fine to medium sand, trace coarse sand and silt: medium dense: moist (SW).	
SS2	8 - 10	3/2/4/5	19	Top 11": Same as above (SW). Bottom: Brown coarse sand, some medium sand and fine gravel, trace fine sand and coarse gravel: loose: moist (SW).	
SS3	13 - 15	3/4/7/8	19	Dark grayish brown medium to coarse sand, little fine sand and coarse to fine gravel, trace silt: medium dense: saturated (SW).	
SS4	18 - 20	4/4/6/13	20	Same as above except trace fine to medium gravel: medium dense: saturated (SW).	
SS5	23 - 25	4/7/15/10	20	Same as above with a 2" silty fine sand layer at 24.5' (SW).	
SS6	28 - 30	11/3/6/8	24	Top 3": Same as above (SW). Middle 10": Brown fine sand, trace silt and medium sand: medium dense: saturated (SP). Bottom: Brown coarse to fine sand, some fine to medium gravel, trace silt and coarse gravel: medium dense: saturated (SW).	E.O.B. @ 31'

7660:1

roject Name Conrail site
roject Number ZF3000

Well No. MW38D Page 2 of 2

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS9	63 - 65	10/20/ 27/40	24	Top 6": Brown fine gravel, little medium to coarse sand; dense; saturated (GP). Middle 12": Brown medium to coarse sand, little fine sand, trace coarse to fine gravel and silt; dense; saturated (SW). Bottom: Yellowish brown fine to medium sand, trace coarse sand and silt; dense; saturated (SW).	
SS10	68 - 70	2/6/6/16	0	No recovery of undisturbed soil.	Some gravel in split-spoon from attempt to wash heave out of boring.
SS11	73 - 75	5/5/ 10/16	16	Top 3": Brown fine gravel, some coarse sand, trace fine to medium sand; loose; saturated (GW). Bottom: Brown fine to medium sand, trace coarse sand and fine gravel; medium dense; saturated (SW).	
SS12	78 - 80	4/7/9/20	16	Brown medium to coarse sand, little fine gravel, trace fine sand and medium to coarse gravel; medium dense; saturated (SW).	
SS13	83 - 85	15/21/ 29/55	24	Same as above (SW).	
SS14	88 - 90	11/15/ 25/38	24	Brown coarse sand, some medium sand, trace fine sand and fine gravel; dense; saturated (SW).	
SS15	93 - 95	10/22/ 37/48	24	Same as above (SW).	
SS16	98 - 100	8/10/ 20/24	16	Brown fine to medium sand, some coarse sand, trace fine gravel; dense; saturated (SW).	E.O.B. @ 103'

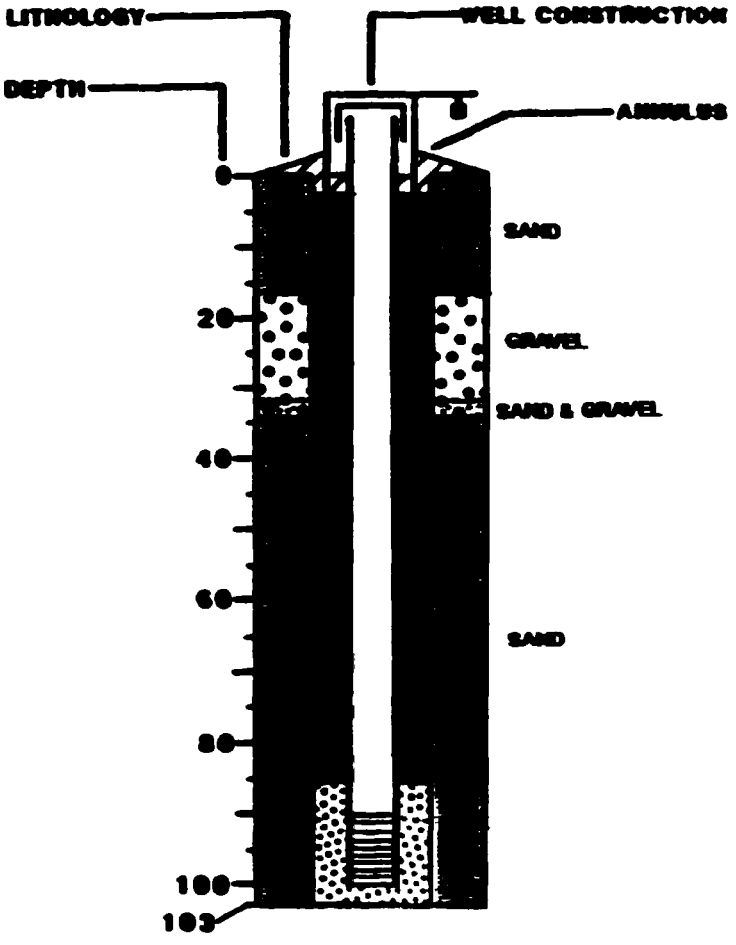
7660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW38D
Location Barber shop on Ash Road
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 736.84'
Drilling Firm Bergerson Caswell
Geologist C. Carlson
Start & Completion Dates 10/31/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 103'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 90'-100'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 85'-103'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 12.8'
After Drilling 15.3' (11/03/91)
After Completion 15.07' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZP3000

Well No. MW38D Page 1 of 2

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	4/5/6/6	19	Dark yellowish brown fine to medium sand, trace fine gravel; loose; dry; grading into grayish brown fine to medium sand, some fine gravel; loose; dry (SW).	MW38D was drilled from 0'-23' without sampling; this part of the log is from MW38S.
SS2	8 - 10	6/2/2/2	15	Yellowish brown fine to medium sand, trace cobbles; loose; dry (SP).	
SS3	13 - 15	4/1/1/1	16	Dark yellowish brown medium to coarse sand, some fine sand; loose; saturated; grading into fine to medium sand, little fine gravel (SW).	
SS4	18 - 20	10/10/ 16/16	14	Brown medium to coarse gravel, some coarse to fine sand, some small cobbles; medium dense; saturated (GW-SW).	
SS1	23 - 25	7/7/7/7	12	Brown fine to medium gravel, trace coarse sand and fines; medium dense; saturated (GW).	MW38S ends here E.O.B. @ 23' MW38D sampling begins here 10/31/91
SS2	28 - 30	3/7/ 15/16	16	Dark brown coarse to fine gravel, little coarse to fine sand, trace silt; medium dense; saturated (GW).	
SS3	33 - 35	5/17/ 25/40	24	Top 6": Dark brown coarse to fine sand and fine gravel; saturated (SW). Next 5": Dark brown coarse to fine gravel, trace coarse to fine sand (GW). Next 7": Yellowish brown fine sand, little silt; medium dense; saturated (SP). Bottom 6": Brown medium sand, some fine sand, trace silt and coarse sand; dense; saturated (SW).	
SS4	38 - 40	5/12/ 50/60	20	Same as above (SW).	
SS5	43 - 45	15/35/70 80 for 2"	24	Same as above grading to well-sorted medium sand, trace fines at bottom (SW-SP).	
SS6	48 - 50	22/21/ 25/40	24	Brown medium sand, little fine sand, trace coarse sand and coarse to fine gravel; dense; saturated (SW).	
SS7	53 - 55	30/30/ 40/50	24	Top 12": Brown coarse sand, some coarse to fine gravel, trace fine to medium sand; dense; saturated (SW-GW). Bottom: Brown medium sand, little fine sand, trace coarse to fine gravel and cobbles; dense; saturated (SW).	
SS8	58 - 60	6/19/ 40/75	24	Brown medium sand, some coarse and fine sand, little coarse to fine gravel, trace silt; extremely dense; saturated (SW).	

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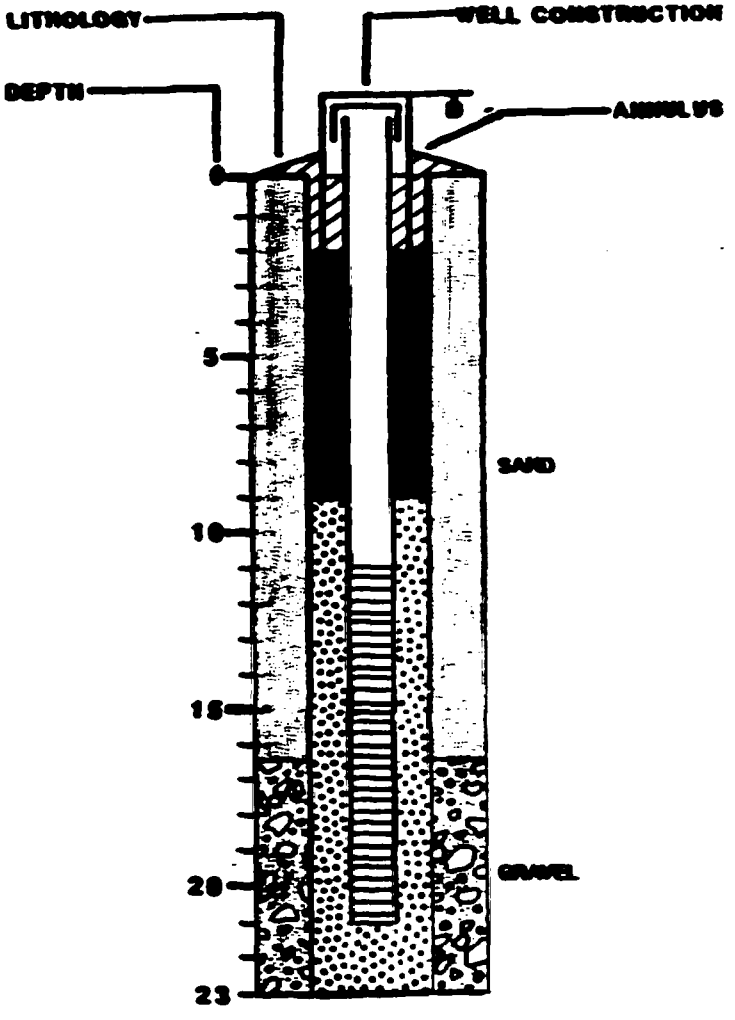
Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW38S
Location Bozzuto, adjacent to LSA4
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 737.15'
Drilling Firm Bergerson Caswell
Geologist B. Lombardi
Start & Completion Date 10/22/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 9"
Boring Depth 23'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 11'-21'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 9'-21'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2144

TEST DATA

Depth to Water Level:
While Drilling 13.6'
After Drilling 15.4' (10/28/91)
After Completion 15.37' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZP3000

Well No. MW38S

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3 - 5	4/5/6/6	19	Dark yellowish brown fine to medium sand, trace fine gravel; loose; dry; grading into grayish brown fine to medium sand, some fine gravel; loose; dry (SW).	
SS2	8 - 10	6/2/2/2	15	Yellowish brown fine to medium sand, trace cobbles; loose; dry (SP).	
SS3	13 - 15	4/1/1/1	16	Dark yellowish brown medium to coarse sand, some fine sand; loose; saturated; grading into fine to medium sand, little fine gravel (SW).	
SS4	18 - 20	10/10/ 16/16	14	Brown medium to coarse gravel, some coarse to fine sand, some small cobbles; medium dense; saturated (GW-SW).	E.O.B.@ 23'

7660:1

roject Name Conrail site Well No. MW37D Page 2 of 2
roject Number 2F3000

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
S13	83 - 85	17/23/ 48/53	12	Brown fine to coarse sand, little fine to medium gravel: extremely dense: saturated (SW).	
S14	88 - 90	18/24/ 34/33	16	Brown fine to coarse sand, trace fine gravel: very dense: saturated (SW)	
S15	93 - 95	50/56/ 52/60	0	Presumably gravel with sand (GP-SP), based on trash in spoon.	~2" sand & gravel trash in spoon
S16	98 - 100	15/16/ 20/29	17	Brown fine to medium sand: dense: saturated (SP).	Overdrilled 1' E.O.B. @ 101'

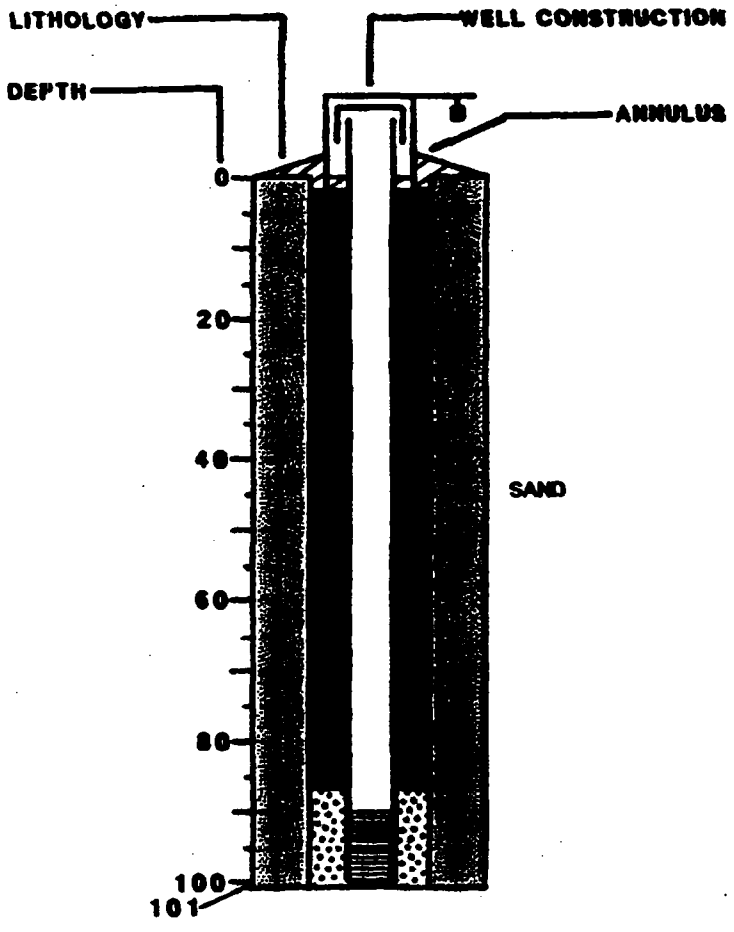
660:1

Project Name Conrail site
Project No. ZF3000

Date Prepared
Prepared by

Well No. MW37D
Location Sprague property ~15' N. of MW37S
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 741.36'
Drilling Firm Bergerson Caswell
Geologist L. Lueck
Start & Completion Dates 10/28 & 10/29/91
Type of Rig Gus Pech

Method of Drilling Mud rotary



WELL DATA

Boring Diam. 8"
Boring Depth 101'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 90'-100'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 87'-100'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling see MW37S log
After Drilling 15.3' (11/03/91)
After Completion 15.96 (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number 2F3000

Well No. MW37D Page 1 of 2

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3.5 - 5.5	4/5/4/5	18	Yellowish brown medium sand, little coarse to fine sand, trace coarse to fine gravel; loose; moist (SP).	MW37D was drilled from 0'-23' without sampling; this part of the log is from MW37S.
SS2	8.5 - 10.5	2/2/2/2	14	Yellowish brown medium to coarse sand, little fine sand and coarse to fine gravel, trace silt and cobbles; loose; moist (SW).	
SS3	13.5 - 15.5	6/10/7/10	16	Brown fine to medium sand, little coarse sand, trace fine gravel, grading downward to coarse sand, little medium sand and coarse to fine gravel, trace fine sand; medium dense; saturated (SW).	
SS4	18.5 - 20.5	9/4/1/4	14	Brown fine to medium sand, some coarse sand, trace fine gravel; loose; saturated (SW).	MW37S ends here. E.O.B. @ 23.5'
S1	23 - 25	10/37/ 42/35	19	Medium brown fine to coarse sand grading down through 3" of fine to medium gravel into fine to coarse sand with little fine gravel, trace silt; very dense; saturated (SW).	MW37D sampling begins here 10/28/91. Pig bounced for 1'-2'.
S2	28 - 30	7/11/ 15/22	14	Medium brown fine to medium sand; trace silt in bottom 3"; dense; saturated (SW).	
S3	33 - 35	11/11/ 10/17	12	Medium brown fine sand, trace clay; dense; saturated (SP).	
S4	38 - 40	17/13/ 21/25	16	Medium brown fine to medium sand; little fine gravel in bottom 2"; dense; saturated (SW).	
S5	43 - 45	12/12/ 13/36	15	Medium brown fine sand, trace medium sand, trace clay; dense; saturated (SP).	
S6	48 - 50	15/26/ 37/37	17	Brown fine to medium sand, little fine gravel, trace clay; very dense; saturated (SW).	
S7	53 - 55	17/21/ 22/21	22	Brown fine sand, trace medium sand, trace silt; dense; saturated (SP).	
S8	58 - 60	17/18/ 17/26	16	Brown fine to medium sand, trace fine gravel, trace coarse sand; dense; saturated (SW).	
S9	63 - 65	19/27/ 31/34	16	Brown fine to coarse sand, some gravel, grading down to fine to medium sand, trace gravel; very dense; saturated (SW).	
S10	68 - 70	18/36/ 38/40	18	Brown fine to coarse sand, some fine to medium gravel; very dense; saturated (SW).	Partially lost circulation around 68'.
S11	73 - 75	27/36/ 56/54	18	Brown fine to coarse sand, little fine to medium gravel; extremely dense; saturated (SW).	
S12	78 - 80	27/31/ 36/43	18	Brown fine to coarse sand, trace gravel; very dense; saturated (SW).	

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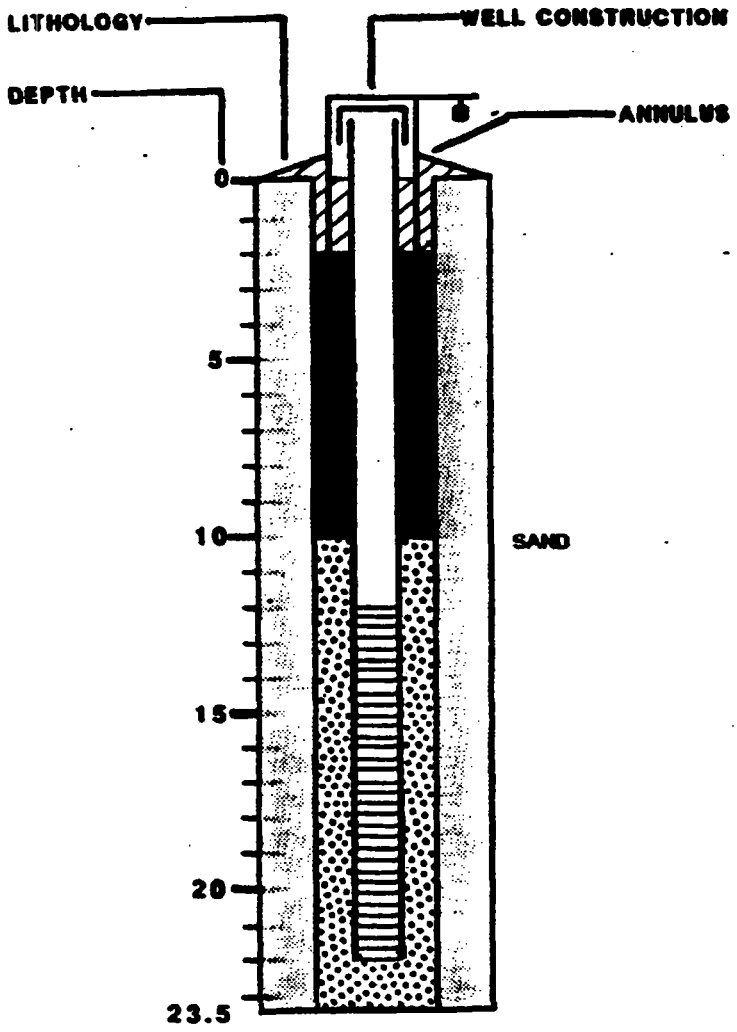
Project Name Conrail site
Project No. 2F3000

Date Prepared
Prepared by

Well No. MW37S
Location Sprague property by LSA3
Owner U.S. EPA
Ground Elevation No data
Top of Inner Casing Elev. 741.47'
Drilling Firm Bergerson Caswell
Geologist C. Carlson & B. Lombardi
Start & Completion Date 10/22/91
Type of Rig CME75

Method of Drilling Hollow stem auger



WELL DATA

Boring Diam. 8"
Boring Depth 23.5'
Casing Diam. 2"
Screen Diam. 2"
Screen Interval 12'-22'
Screen Type 304 stainless wirewound
Well Type 304 stainless steel
Well Construction:
Filter Pack Silica sand 10'-23.5'
Seal N/A
Grout Enviroplug bentonite
Lock No. 2344

TEST DATA

Depth to Water Level:
While Drilling 13.6'
After Drilling 16.8' (10/29/91)
After Completion 16.10' (12/02/91)

Hydraulic Conductivity:
Test Method
Results
Comments

Project Name Conrail site
Project Number ZF3000

Well No. MW37S

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS1	3.5 - 5.5	4/5/4/5	18	Yellowish brown medium sand, little coarse to fine sand, trace coarse to fine gravel; loose; moist (SP).	
SS2	8.5 - 10.5	2/2/2/2	14	Yellowish brown medium to coarse sand, little fine sand and coarse to fine gravel, trace silt and cobbles; loose; moist (SW).	
SS3	13.5 - 15.5	6/10/ 7/10	16	Brown fine to medium sand, little coarse sand, trace fine gravel, grading downward to coarse sand, little medium sand and coarse to fine gravel, trace fine sand; medium dense; saturated (SW).	
SS4	18.5 - 20.5	9/4/1/4	14	Brown fine to medium sand, some coarse sand, trace fine gravel; loose; saturated (SW).	E.O.B. @ 22.5'

7660:1

Project Name Conrail site
Project Number 2F3000

Well No. MW44D Page 2 of 2

Sample No.	Sample Depth From - To (ft)	Blow Count	Recov. (in.)	Description	Remarks
SS17	83 - 85	21/40/ 48/50	21	Same as above (SW).	
SS18	88 - 90	20/26/ 33/38	20	Same as above (SW).	
SS19	93 - 95	25/35/ 46/50	17	Same as above (SW).	
SS20	98 - 100	27/28/ 39/39	19	Brown fine to coarse sand, trace fine to medium gravel; very dense; wet (SW).	
SS21	103 - 105	27/24/ 60/61	19	Brown medium to coarse sand, little fine to medium gravel, little silt, trace fine sand; extremely dense; wet (SW).	
SS22	108 - 110	22/44/ 45/45	17	Same as above (SW).	
SS23	113 - 115	24/26/ 56/60	20	Brown medium to coarse sand, little fine to coarse gravel, little silt, trace fine sand; extremely dense; wet (SW).	
SS24	118 - 120	23/62/ 90/90	12	Same as above (slightly less silt) (SW).	
SS25	123 - 125	35/36/ 50/60	14	Same as above (SW).	E.O.B. @ 125'

660:1